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ABSTRACT

This booklet consists of four papers by separate authors that show how the Dutch National Institute for Curriculum Development (SLO) tries to improve the quality of education through curriculum research and development. The first text, by Johan C. van Bruggen, provides a general introduction to SLO, showing how it generates curriculum knowledge among school practitioners through five principles and procedures. The second text, by Ivar Labordus, sets forth a hypothetical curriculum development strategy for a national system of comprehensive junior secondary education. The third paper, by Kerst Boersma, describes specific problems in an SLO project for science curriculum in junior secondary education. The fourth paper, by Eddy O.I. Jozefzoon, analyzes problems involved in evaluating the work of SLO. It reports on research projects that provide evidence of the actual effects of SLO projects. The second part of the booklet provides information about the educational system in the Netherlands, the SLO as part of the educational support structure, an overview of the curriculum development projects of the SLO, and a review of curriculum research projects. (TE)

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Coordinating Curriculum Policy and Practice

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AN AERA SYMPOSIUM

Papers and Background Information
edited by Eddy O.I. Jozefzoon

National Institute for Curriculum Development

Coordinating Curriculum Policy and Practice

The Innovative Role of the Dutch National Institute for Curriculum Development

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National Institute for
Curriculum Development

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Foreword

This booklet can help you to gather some knowledge about the work of the Dutch National Institute for Curriculum Development SLO. But the main purpose of the four texts is not "to give information", but to show [in questions, information, research-evidence analysis] how this national institute for curriculum development in its particular context tries to help to improve the qualitiy of education by creating curriculum knowledge in such a way that users of this knowledge can indeed improve their daily work in education.

The first text gives a general introduction to SLO and its way of creating curriculum knowledge [Van Bruggen]. This text describes the problem and five principles and procedures. The second text describes a recent phase in the process of curriculum development for a non-existing [except in some experiments] national system of comprehensive junior secondary education [Labordus]. This second paper gives an accent to the relations between curriculum development as a professional job and politics. The same can be said of the third paper [Boersma], which describes specific problems in a project of SLO for science curriculum in junior secondary education [Boersma]. This paper illustrates and elaborates the general introduction and the five principles stated there, but it also shows specific difficulties.

The fourth paper [Jozefzoon] analyses some problems of "evaluating" the work of SLO and similar institutes. It reports about some research projects that give some evidence about the impact of some SLO-work. The four papers have been written for an invited symposium of the Special Interest Group "Creation and Utilization of Curriculum Knowledge" of the American Educational Research Association for its annual meeting in San Francisco, April, 1986.

In the second part of the booklet you find information about the educational system in the Netherlands, the SLO as part of the educational support structure, an overview of curriculum development projects of the SLO and, a review of curriculum research projects under auspices of SVO.

Although this booklet has its first use for AERA, we have tried to give it a formula that makes it possible to hand it over to our many visitors and friends from foreign countries.

My colleague, dr. Eddy Jozefzoon, did the necessary work [gathering information, editing, taking care of correct translations] for preparing this booklet. I thank him and the other staffmembers of SLO involved.

drs. Johan C. van Bruggen, director curriculum SLO.

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Part One : The Papers

7

1. Introduction

A central problem of curriculum theory is how curriculum development and curriculum reserach can genuinely contribute to the innovation of education on national, school and classroom levels. The Dutch National Institute for Curriculum Development in the Netherlands [SLO] tries in its own specific way to answer this question. This booklet gives part of that answer by describing and discussing some of its experiences and findings in the past years with regard to its tasks in Dutch education.

First of all, drs. Johan C. van Bruggen, director curriculum of the SLO, describes and discusses in the second chapter the topic: "The Dutch National Institute for Curriculum Development [SLO] between Schoolpractice, Politics, Educational Sciences and Innovation". The Dutch SLO, he says, has as its central task to create "curriculum knowledge", to be used by teachers, advisors, trainers, authors of textbooks, authors of examinations, and the government. The SLO, so he continues, has to complete this task within the specific context of the Dutch educational field. This context is determined by

- freedom for schools to determine their own curriculum;
- a huge amount of publications in books, papers, journals and debate about education;
- lots of institutes for in-service training and curriculum development, but working without central coordination;
- rather small schools with very independent teachers and principals who are administrators rather than education innovators most of the time.

SLO has to find procedures and principles for creating curriculum knowledge in such a way that this knowledge fits into the context and thus can indeed be used for real improvement of education.

Van Bruggen shows that the procedures and principles have to be applied in the different projects in a creative way, fitting into the specific details of the innovation profile of a certain group of users.
He formulates the procedures and principles as five general points:

1. Long and careful preparatory phases in which needs for new knowledge are analysed and discussed with as many key-persons and institutes as possible and needed. The output of such a preparatory phase is a plan for the project, a document with provisional choices and ideas and with a network for collaboration, evaluation and consultation.
2. Coordination -but without power- with the work of other bodies in research, innovation, in-service training, textbook production, etc.

3. A policy for early and short-living publications in order to provoke criticism and partnership. Publications are located at the three levels of curriculum knowledge: the national framework, the school specific curriculum, the classroom planning.
4. Collaboration with teachers who act as creators of curriculum knowledge or as consultants or as evaluators. All publications have to show that they had their feet in schoolpractice.
5. Coordination of the content of curriculum knowledge for different subjects and different levels of planning.

Van Bruggen argues that there are tensions and conflicts in the realization of these principles in the 61 projects of SLO in the Dutch context. He describes seven of them. He shows that the main problem is -as in other countries too- the lack of coordination with dissemination of curriculum knowledge on a large scale and in a rather short period. Van Bruggen concludes that in some projects there is evidence that the approach of SLO is rather successful in terms of impact.

The second paper, by drs. Ivar Labordus, head of the SLO sub-department for junior secondary education, has for its topic "Curriculum Development between Schoolpractice and Legislation: the Comprehensive Junior Secondary Education in the Netherlands" Labordus starts with a short overview of the various tempts to develop a comprehensive secondary education in the Netherlands. The question is discussed how curriculum development and its products can [or cannot] play a role in the innovation of a educational system on national level. Labordus continues by describing how curriculum development is embedded in a national strategy. He gives a description of a schoolbased and schoolorientated curriculum development strategy and discusses it in the light of the mentioned question how curriculum development can contribute to innovation of an educational system on the national level. He argues that a school**based** and school**oriented** strategy is not the best way to accomplish this goal. A mixed strategy in which a well balanced position between individual schools and the central government is taken, gives the best promises. He continues his argument by saying that a relatively autonomous position for the [national] institute for curriculum development is necessary. But, Labordus says, well articulated central policy on the direction of wanted developments is also a crucial factor in regard to the effectiveness of curriculum development as a means for innovation.

The third paper, by dr. K. Boersma, head of the SLO sub department for science, has for its topic "The Innovation of Junior Secondary Science Education in the Netherlands". Boersma describes and discusses the development strategy of the SLO Junior Secondary Science Project within the context of the policy of the SLO governing council and of the national politics. He takes as starting point the information given by Van Bruggen and Labordus in their papers. He takes up the main questions in the devel-

opment of the Science project. They are questions concerning the choice of content and the didactics of science. He also deals with the question what kind of products the project should yield and what procedures and strategies are to be followed.

After an introduction to the project., Boersma describes its development-strategy. As a characteristic of this strategy he reports a combination of both inductive and deductive approaches. In the development of the project he assigns a prominent part to the Integrated Curriculum-design for Natural Sciences. At the moment this draft is elaborated by the project in largely deductive procedures up to the level where it is possible to define thematic contents. Boersma goes on to state that developing thematic units is of great importance to the project. In this way the premises of content and didactics can be worked out into more detail. Important starting points are the decisions to define one subject ''science'' and te select contents on the basis of their relevance. This relevance being largely determinated by the immediate interests rising from pupils' experiences. It is this second premise, that of relevance from the pupils' point of view, that raised a great number of questions to which there were no ready answers available. Boersma shows with much detail how it is tried to find workable solutions to this problem. In doing so he presents a fairly complete view of the Science Education Project and its working-strategy.

Chapter five contains by way of illustration the proposal for a Junior Secondary Science Curriculum made by the SLO in 1985. This proposal is part of The Design that the SLO has developed on request of the Ministry of Education and Science, aimed for a new comprehensive junior secondary education. The Design is published with as title: **What Curriculum Would Be Offered at the New Comprehensive Junior Secondary Education.**

In chapter six, the paper of dr. Eddy Jozefzoon, head of the SLO subdepartment for curriculum theory and evaluation, is presented. The topic of that paper is ''Use and Impact of some SLO Publications''. After a stipulation of the supporting function of documents produced by the SLO, the relationship of the SLO with educational research institutions, Jozefzoon operationalizes ''impact'' in four criterions or questions. After that he briefly gives background information of the five studies on utilization and usefulness of the support documents which are part of the research completed. He thereafter reports and discusses the findings of the five studies. A major conclusion is that the documents studied do it very well, but the research technics used do not allow the [general] conclusion that all SLO projects and documents are succesfull, have impact on education innovation and, effect on the student in the classroom. The impact of the SLO on pupils' learning behaviour is no part of the studies made. Finally Jozefzoon discusses three problems which are inherent to an investigation into the impact of every national curriculum development institute.

For a solution of these problems, he concludes, other research means than the traditional ones should be developed.

From the presented papers in this booklet, we can conclude that curriculum development and curriculum research in the Netherlands as carried out by the SLO is to be considered as a contribution to the solution to the problem mentioned at the beginning of this introductory chapter and, to relevant theory development. This is certainly the case if curriculum theory is viewed as a practical theory in the double sense of [1] developed from a practical situation and [2] aiming to contribute to the solution of problems in educational practice. The symposium on coordinating curriculum practice and policy where these paper and one of drs. Jacques van Velzen on "Government Policy and the Framework of a Core Curriculum for Junior Secondary Education" are presented and discussed, is in our point of view of importance because - and that we believe - it can also contribute to the expansion of our knowledge in the framework of comparative theory of education.

Johan C. van Bruggen

2 The Dutch national institute for curriculum development [SLO] between schoolpractice, politics, educational sciences and innovation.

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1 Introduction; formulating the problem

The text of this paper aims to give a general impression of the work of the Dutch National Institute for Curriculum Development [SLO] in creating "curriculum knowledge" in such a way that the various groups in the "educational field" can use this knowledge in the specific Dutch context. More details of the work done by SLO are presented in the other three papers in which the way of tackling the general problem is illustrated in more specific cases and in which information is given about problems and solutions. The general situation is considered in this paper with special references to aspects of the other three papers.

In many countries, since about 1960, many institutes and centres have been set up for curriculum development, curriculum research, or curriculum innovation; among them are the Regional Laboratories in the USA; the Schools Curriculum Development Committee reorganised in 1984 from the Schools Council in the United Kingdom; the Skoloverstyrelsen in Sweden; the Landesinstitute in the Federal Republic of Germany and many others. In addition, larger and smaller projects for curriculum revision have been instigated by universities and education ministries, mainly, in the field of sciences and mathematics.

All this work has resulted in thousands of books or packages in which "curriculum knowledge" has been set down and evaluated by experts in order to improve current practices in schools. Experience and evaluation research however show that this "curriculum knowledge" is often neglected in daily practice. Reference can be made to the Rand-studies of Berman and McLaughlin [1978] and the research of Goodlad [1983]. The effect that these projects have had on changing the policies of education authorities has been slowly coming about.

The results of curriculum research, published in periodicals or reports, do not easily reach the schools or the teachers; the same goes for curriculum development proposals [although not always!] and for policy information.

Traditional RDD-approaches [Research-Development-Dissemination] seem to have little effect on teaching or, in few cases, they come into operation very slowly. "Problem-solving" assignments led by consultants for all schools are too expensive. The International School Improvement Project [ISIP] under the auspices of OECD/CERI in Paris arranges for the exchange of information and experience of research workers, officials, headteachers, educational scientists and curriculum developers from different North American and Western European countries. A recent publication, "Making School Improvement Work" [Velzen, W.G. van e.a.; 1985], concluded that a strong policy is needed for devising a strategy in which developing curricula, making teachers more professional, strengthening school organisation, planning and implementing renewal programs and suchlike are coordinated.

Also curriculum development itself - work that can be defined as the creation of uselful "curriculum knowledge"- has to be planned and done in close cooperation with other supporting activities, in order to ensure that the knowledge is used in schools. Implementation depends largely upon many specific factors of the particular teaching situation in particular regions or segments of the educational field. Factors like the amount of central control over curricula and examinations, the role of headteachers and special officers in and around the schools, traditional procedures for producing and using textbooks, the regulations for in-service-training and suchlike.

In general, all this means that the work of a national institute for curriculum development, like SLO, must comply with these factors as closely as possible. Both, with national factors and with the requirements of the varying schoolbound factors.

The problem description -still to be formulated globally- for this text then is:

> How can a national institute for curriculum development produce useful "curriculum knowlegde" so that this knowledge -within the specific national context- can contribute beneficially to the improvement of teaching in schools?

Firstly, I will consider this problem in relation to some of the more important features and factors of the Dutch situation and provide briefly some information about SLO. Next, I will try to formulate the problem more specifically. Thereafter, I will describe curriculum development in terms of the principles and procedures that have been developed at SLO for tackling the problems. Then, conflicts and unsolved problems will be examined and the findings of the past ten years will be reported. Finally, I will review the problem description.

2 Specific factors in Dutch Education Policy and System

This chapter will not look at all the peculiarities of the Dutch education system, that is rather difficult to understand by people who are not familiar with the system. I will only give some attention to those factors that are important when dealing with the problem that has been described generally in the previous chapter. Consequently, it does not examine general factors, such as, the inherent sluggishness when revising the education system; the worldwide professional freedom of teachers and suchlike. The following factors are more specific to the Dutch situation and to understanding the way that SLO operates.

2.1 In the Constitution, the Netherlands defines that, in principle, education shall be free, with restrictions from the viewpoint of quality and general interest. This principle is translated into a regulation that says that

each group has the right -if reasonable demands for numbers of pupils, procedures to be followed and suchlike are satisfied- to establish a school, to select teachers, to make a curriculum, etc. Since the beginning of the 20th century, this right has been connected with complete subsidies. The consequence of educational freedom is that Dutch schools are very free to set their own curricula.

The 1984 Law for Primary Education only defines general objectives and a number of subjects to which schools must conform. Additionally, the law makes it compulsory for each school to work out its own specific curriculum. This document has to describe the specific objectives of the school; the syllabus to be taught; the most important characteristics of the pedagogic climate to be developed; the organisation of the teaching process; and so on.

This requirement makes it possible for governmental school inspectors to judge whether the rather vague demands of the law are satisfied by the school. And -secondly- to enter into discussions with the school about all kinds of problems and interpretations. But, in principle, each primary school is at liberty to prepare its own curriculum.

Essentially, the same thing applies to secondary education although not all these schools are obliged to write their own specific curricula in the way it is compulsory for primary education. Another difference is that there are compulsory examination programmes for secondary subjects and, above all, lesson-timetables that are defined in circulars coming from the minister of Education. It follows that the curriculum freedom for secondary schools is drastically restricted. On the other hand, it must be said that timetables, in general, allow plenty of scope when interpreting the law and the examination programmes are somewhat openly formulated. However, there is a long tradition laid down in years of examinations made by committees of teachers and inspectors. This tradition is strengthened by textbooks of commercial publishers. Although in fact there is little violation of the curriculum freedom of secondary schools, in practice, they feel to have little freedom, because they interpret the traditional subject matter taught, the textbooks used and the examinations as almost belonging to the law.

2.2 Due to the freedom that the law allows schools concerning their curricula, it is clear that proposals for new curricula, or parts of curricula, from SLO or some other groups can only have the status of proposals and ideas. To take or to leave... No document coming from SLO is compulsory for the school, a teacher, or for the governing board of the school.

Even in those projects where the SLO output is a proposal for new examination regulations in a certain subject of secondary education [e.g. Chemistry, Economics, the Dutch Language], such a proposal is submitted to the minister; then, the minister again follows a very strict procedure of consulting all the relevant people, before making the final regulation. Therefore, SLO has no "authority" concerning curricula in the Netherlands.

2.3 A teacher in the Dutch education system receives a lot of information and advice and there are plenty of educational periodicals too. Both the teachers unions and the teachers associations publish leaflets in particular subject areas, as well as, of general interest. Several national newspapers issue weekly education supplements. Many pressure groups and bodies and even industrial firms send folders or booklets to all the schools. There is an abundance of information offered by competing commercial publishing houses with respect to textbooks and other materials. In addition, there are opportunities for the teachers to enroll in evening-classes or further education, for attending meetings and teachers' conferences, both locally and regionally. Debates are held regularly in Parliament about educational issues of a structural or financial nature; sometimes the subjects taught are discussed. SLO has to compete with a big amount of literature as well as radio and television information when it publishes proposals for improving the school curricula.

2.4 During the past 40 years a large number of institutions have come into existence for the purpose of improving education, by means of fundamental research, applied research, the development of new ideas for curricula, making films, in-service-training for teachers, the supervision of individual teachers or teams in certain schools [mostly for primary education], organising and implementing national innovation programmes in a particular field, coordinating fundamental and applied educational research, the preparation of tests that teachers can use for evaluating their teaching work....

In this support structure are engaged about 2500 staff [compared with about 200,000 active teachers in the Netherlands]. Of these 2500, around 1900 are employed by local and regional service organisations that are mainly associated with primary education. Nearly all of these organisations are financed by national or local governments; at least for the greater part.

One of the problems created by this "cloud of wisdom" [Bolam] is the lack of coordination between the various organisations. It cannot be assumed that a curriculum proposal from SLO, or any other institution, will be accepted nationally for dissemination to all the local education authorities and for incorporation into their supervisory programmes. This point is very important in order to understand the policy of SLO. One of the "terms of reference" when SLO was established in 1975, said that SLO must not operate in the fields of fundamental or applied research, or training teachers, or supervision and guidance of teaching.

For these purposes appropriate institutions already existed and still exist and this means that SLO can only make proposals for improving teaching without getting involved in implementing them. Cooperation between the autonomous institutions for innovation, teacher training,

supervising and guidance, research and evaluating education is essential. Of course, this means that getting an agreement about the directions for innovation and coordination involves very many people and institutions. This fact coerces the different institutions and bodies to negotiate with eachother in order to regulate cooperation.

Although in countries like the USA, Great Britain and France there are specialised institutes for educational research or for innovation too, the division of functions and responsibilities between individual organisations is never so sharply demarcated as in the Netherlands.

2.5 The average Dutch primary school is quite small [four to seven teachers]; secondary schools are larger, but most schools offer only one category of education, at a particular level, or of a particular type, and they have between ten and twenty teachers. In some comprehensive schools some 50 to 80 teachers will be found. It is remarkable that, in by far the greatest number of Dutch schools, the headteacher is more like an organizational or administrative manager than an educational innovator. On this point, the Dutch school clearly differs from most of its counterparts in Western Europe, as became obvious during an investigation by 80 members of the European Forum for Educational Management [Liket, Van Marwijk-Kooij, Van Bruggen;1985]. However, more emphasis has been placed on training headteachers in the last few years. Nevertheless, a curriculum development institute like SLO cannot have an easy entrance into the improvement of the curricula in schools by mainly organising programmes for headteachers, because they have little influence on the process of improvement.

In the context of Dutch education, the five factors described above, naturally, offer specific challenges to a curriculum development institute like SLO, when this institute tries to support the improvement of education in schools by producing written curriculum knowledge. It will already be clear that revolutionary and rapid changes in curricula are hardly possible, because of the Dutch system's inherent freedom, its inertia and because of the divided responsibilities.

The most important challenge for SLO is threefold: firstly, analysing and channelling the requirements for revising curricula like those are recognized in the intricate system of "Checks and Balances". Secondly, starting development projects that respond to these problems by finding solutions. Thirdly doing, this job in such a way that these answers are recognized as valuable contributions and are adopted, disseminated and institutionalized [Hameyer; 1986].

Two important strategic consequences for the work of SLO emerge rather directly from this context, namely:

a. Improving of education can only partially occur through improvement of the curricula used in schools and -beyond that- implementation is a responsibility, in the first place, of the schools themselves. Influencing

this responsibility is a shared possibility of the government, the school inspectors, the schools governors, the supporting institutions, the teacher training colleges and the information agencies.

b. It is excluded that SLO could work with more or less traditional RDDstrategies [Research-Development-Dissemination], or with a power-coercive strategy, or only with a problem-solving strategy fitting into an individual school or teacher. The work of SLO will always be characterised as a mixed strategy depending upon the exposed needs of the system and the available opportunities for cooperating and developing ideas [see: Berg, R. van den; 1986 and Bruggen, J.C. van; 1986].

3 General information about SLO

Because general information about SLO can be obtained from other sources, only some headlines in facts and figures will be reported here.

3.1 SLO was established by the Dutch government in 1975 in order to unite the existing committees for curriculum development. Three duties were assigned to this new institute:

a. The development of proposals for new curricula for schools and the development of proposals for new examination programmes and all other ideas related to the curricula that are used in schools. This developing work can be done by SLO itself or by other institutes invited and paid by SLO.
   Note: So SLO functions both as an institute and a foundation for curriculum development [about 15% of its budget is allocated to subsidizing other institutes or groups].
b. The preparation of advice for schools, school organisations, schools inspectors, publishers, the government, other institutes in the support structure, in connection with curriculum development and policies.
c. The coordination of curriculum development in the Netherlands; within SLO, but also the coordination of SLO-work with the work of other bodies including universities and publishing groups.
   Note: as stated in section 2, SLO has no power for this coordination, but "only" takes the initiative for combining together groups and people, convening meetings and conferences, publishing reviews and analyzing suitable materials and suchlike.

3.2 SLO is fully financed by the government and it has an annual budget of around nine million dollars. The institute is staffed by about 150 "professional staff" and about 130 "technical staff" in administration, printing, promotion, etc.

3.3 SLO is controlled by a Board of Governors which is dominated by

representatives of national organisations of school boards and teacher unions. The Board determines the annual work programme; confirms new curriculum development projects; decides the general policy concerning strategies, methods of working and organisation; appoints directors and coordinators of departments in the institute; as well as influences greatly the daily progress of affairs. The Board meets once a month.
Note: on this point, SLO differs from most similar institutes in other countries like France, Korea, Sweden, Great Britain and the United Stated, where general management is not associated with day-to-day operations.

3.4 SLO is obliged to ask consideration and advice about project proposals, drafts of publications and general policy from subject committees. The Board itself appoints the members of these committees, but has to follow regulations about expertise, numbers and suchlike that are imposed by the minister.

3.5 SLO is organised into seven departments, each based on a school''discipline'' and three smaller departments for ''coordinating'' curriculum development with reference to primary schools, junior secondary education and senior secondary education. The eleventh department is a small one with tasks in evaluating, curriculum theory and curriculum research; all supporting the development. In addition, there are departments for administration, finances, publishing and suchlike. The directorate comprises three senior staff members [general, curriculum and supporting services]. Presently, about 60 projects are in progress; from three to six staff work on each project. Each project has its own budget that varies between 10,000 and 100,000 dollars. Some projects concern only one subject area for one type of school, whilst other projects are interdisciplinary or coordinating.

4 Review of the problem

The consequence of the global information presented in the previous two chapters is that some solutions for the problem of fulfilling the task of a national institute for curriculum development like SLO are not possible. For example:

a. A policy of power: neither the Board of SLO nor the minister is capable of saying the developed curricula are compulsory for all schools. Such a policy has been followed -to a greater or smaller extent- in France, in Sweden [Grundskola] and in some US States with rather detailed curricula.
b. A policy based on a classical RDD-approach: developed curricula will be disseminated and implemented spontaneously by the efforts of national and local agencies for innovation.
c. A policy in which SLO itself works out the developed curricula into

textbooks, in-service-training programmes, television courses, school organisational services and suchlike, followed by implementing them and performing any relevant research. This combination of providing research/development/in-service-training/innovation/support services for individual schools is becoming more common in the Regional Laboratories in the USA, some state institutes of Western Germany and to a large extent in the Korean Educational Development Institute [KEDI] in Seoul.

Although it is uncertain if such policies have enough effect in other countries, in the Netherlands they cannot be considered. SLO has no curricular authority and cannot and is not allowed to do research, or to evaluate the impact that curriculum proposals have when in operation. SLO cannot and may not carry out in-service-training programmes, nor publish any textbooks commercially.

There are no definite procedures laid down for coordinating the policies of the different organisations in the "support structure" and SLO's own policy is determined rather strongly by advisory committees and the complex Board. Therefore, it is difficult to define precise priorities.

Yet, a national institute like SLO is expected to make perceptible contributions for revising and improving teaching by influencing the actual curricula used by schools. These curricula -and the teaching process guided by the curricula- should be changed and improved gradually or suddenly. Sometimes, an SLO contribution should be perceptible in revised examination programmes, as these are laid down by the national government; sometimes "curriculum knowledge" developed by SLO should perceptibly change the format and content of textbooks.

At the end of the first chapter I asked the question: "How can a national institute for curriculum development produce useful "curriculum knowledge" so that this knowledge -within the specific national context- can contribute beneficially to the improvement of teaching in schools?". Formulating the question in this way takes for granted that creation of useful "curriculum knowledge" as such is possible. In other words: creating good ideas for content, organisation and realisation of parts of good education [for example for science] is possible. Also the shaping of ideas in form of instructions and guidelines for teachers is possible; also the try-out in practice with respect to validity and other evaluation criteria is possible.

Much has been written about the "craft" of curriculum development and a lot of experience has been gained in practice; also about its components, for example:

- setting objectives [Bloom, Eisner, De Corte, Treffers, a.o.];
- choice of contents [Wagenschein, Adler, Lawton-Skilbeck, a.o.];
- curriculum evaluation of a formative and summative nature [Madaus a.o.; Popham, Eisner, Guba, Stufflebeam, a.o.];
- project strategies [Stenhouse, Shipman, Frey-Hameyer, a.o.].

However, it is not enough that the developed and evaluated knowledge is recognized as useful by a small circle of experts, but also by the majority of teachers themselves. Only then the knowledge will be useful for improving the quality of teching. From a considerable amount of research and experience, it is known that involvement and participation of teachers in curriculum development projects is very important in order to close the gap between development and dissemination. The Rand-studies of Berman and McLaughlin have been mentioned already, but the same picture appeared from the work of Van den Berghe and Van den Berg [1984]. The problem for a curriculum development institute is to organise this involvement and participation of teachers. And to do so within the conditions of finances provided, the separated tasks of other institutes, the relationships with national government policies and other factors.

Therefore, the accent in the formula of the problem lies on the "how" of the creation and on the context of the specific national circumstances. In the text that follows, I shall place the emphasis on the principles and procedures that are used by SLO in planning and executing the work for and in the many projects. An important point is that national circumstances may be distinguished in general ones [section 2], and in particular circumstances in certain teaching fields. These particular context conditions ly for example in the presence of a powerful professional body [or not], a recognized textbook tradition, a detailed examination programme [or not] and suchlike. Exactly these particular conditions make it necessary to realize general principles and procedures in each project, in a creative way. That means that there cannot be a single SLO strategy, but only a number of principles and procedures.

In the following chapter the most important of them will be mentioned, illustrated to some extent and related to the information in section 2.

5 Principles and procedures of SLO work

5.1 Flexible planning based upon analysed needs and facilities

Decisions to initiate new projects are taken at the request of a school, a group of schools, an association with particular interests, a national association of schoolboards, the government a.o. After the "go-decision" to prepare a project on the basis of a request a period of preparation of six to twentyfour months follows. In this period, further investigation of the needs for changes in the curriculum is carried out. At the same time, opportunities for systematic curriculum development are examined along with the possibilities for cooperation with other organisations in the fields of development, research, schooling and innovation. The preparatory period extends into a project plan for five to seven years. Based upon this project plan, the Board of SLO, advised by its advisory committees and the executive directors of SLO, decides the project budget and manpower required.

When a project plan has been accepted, then detailed plans for about two years are worked out. By this system of planning, the work in progress is adapted to suit the feedback obtained from the advisory committees, from the larger general purpose committees, from the results of smallscale innovation experiments and from formative curriculum evaluation or other information. Everything is so carefully planned to maximize the input of the many viewpoints of cooperation partners and organizations, and the varied expertise available in the Dutch education system. At the same time, such a rather detailed system of planning and decision making gives more possibilities to control if sufficient flexible adaption to new events and experiences is made and if this is done in an adequate way.

As a consequence of this principle -which has been worked out within SLO into fairly strict procedures- quite a long preparation period is needed for the larger projects. Such a process of preparation results in a number of documents. These have to be suitable for a process of consideration and judgement by the most important groups that are [or should be] involved in periods of creation, try-out, experimental innovation or other activities in the project. This consideration can lead to important changes in the initial plans and ideas. At the end of the consideration process the Board takes decisions on the basis of the different documents, evaluations and advices.

An illustration of the preparation for a project entitled ''Science Education in Junior Secondary Schools'' will be presented by Boersma. It took about two years to prepare this project. In that period the emphasis was put on the following items:

- an analysis of a number of requests received from schools and teachers' associations;
- an analysis of the developments in the field of ''integrated science'' in other countries;
- consultations with research workers, inspectors, schools and innovation institutes;
- drafting a basic document to show different choices for the curriculum to be developed and a sketch for the project plan;
- discussing the basic document and the project plan with many groups and persons to be involved in the project.

Also, Boersma will show how various perspectives and concepts were incorporated into this process of preparation, such as the following:

- contents and didactics of ''science education'';
- different forms of integrating sciences;
- opportunities to create examples of teaching materials and rough drafts of the curriculum, in order to stimulate a broad discussion amongst the teachers in early phases of the project;
- opportunities for coordinating the development with other projects for mathematics, social sciences, technology, computer education and the

development of the overall curriculum for comprehensive education [see the texts of Labordus and Boersma].

It will appear from this general elaboration of the principle of planning and, largely from both Boersma's and Labordus' illustrations:
- that SLO tries to formulate ideas for renewing curricula on the level of practice in the classrooms and also on the level of adapting the programme for the subject in question in relation to the curriculum of the school as a whole, as well as, to frame the curricula for national usage;
- that the involvement of individual teachers, teachers' associations, inspectors, research workers and government officers is highly appreciated and that much time and money is invested in order to make this involvement work;
- that great care is given to the coordination of a general policy [e.g. the improvement of the process of developing specific curricula within the school itself; or the connection with important elements of the national educational policy] and the specific policy related to the choice of a curriculum strategy for a particular project in a certain subject area. Naturally, this coordination provokes discussions within the institute and with the advisory committees and the Board that are not always smooth...;
- that this attention, given to long-term plans [five to seven years] and to the plans for two year periods into which they are broken, makes it possible to fit to changing needs and circumstances and the experience gained from experiments with innovations and curricular problems [e.g. the definition of the term "context" as one of the key ideas in the science project].

These principles and procedures attempt to fit to the specific factors of the Dutch situation [see section 3]. An important element is the considerable publicity given to discussions and decisions. This publicity can improve the involvement and participation, but can also lead to delays and vague compromises.

5.2 Coordinating with activities of other institutions

We are kept continually alert -in developing the project plans for shorter and longer periods, but also in the day-to-day operations- for possibilities to link the work with many other people from different organisations. Also, the plans must be coordinated with government educational policies and with the findings of the school inspectorate, etc.
This coordination of curriculum development is always directed to improvement of the involvement and participation of as many groups and persons as possible in order to relate curriculum development to research, evaluation, innovation and policy development work.

This continual concern with participation and coordination is handled in the following ways:

a. through official cooperation between SLO and other organisations or groups, in the form of contracts, joint agreements, etc.;
b. through the construction and continual expansion of informal networks for the collaborators from different organisations, schools, civil servants, inspectors and research workers [by joining people in supervisory committees and at conferences and talks; by involving people in writing articles and books];
c. through publications in early stages of a particular curriculum development project coupled to an active diffusion and information policy, also in order to improve participation, to invite criticism and to create opportunities for dissemination.

In paragraph 5.1. it was mentioned that SLO invests a lot of personnel, time and money in taking initiatives in the opening stage of a project, such as the one for Science Education; also, to bring together as many people as possible for discussions, shaping opinions and putting in their experiences and knowledge in later stages. This is done in the first place to base the decisions to be taken about the content and strategies of new projects on a solid knowledge. Another aim is to stimulate involvement and cooperation of groups in the teaching field.

However, it is impossible to invest unlimited amounts of time and money, because of the wide field and the large number of project allocations over which SLO has to spread its personnel and finances. The project team for Science Education is rather well equiped in comparison with many other SLO projects, but also for this team it is not possible to spare the time to have talks with teachers and trainers of teachers all over the country. Because also much time has to be invested in study for the design of experiments and lessons; in implementing them in project schools; in reporting on experiences and analyses; in revising the experimental curriculum material; in preparing talks with the inspectors; and in publishing articles in the many educational periodicals. In other words: the limited number of staff in the curriculum development section cannot [apart from the limitations of tasks of SLO] perform all the intensive innovation preparing activities that they feel they should do.

Certainly, some good working relationships have been created with an investigation regarding the patterns of interest of children, with the evaluation of draft-curricula, with a supervisory group, with key persons from many other organisations, with the development of in-service courses and of a new experimental teacher training programme, with various educational magazines and with a wide national project for innovation in education [SIO].

However, a pertinent national strategy for implementing the results of this project has not yet been established. A well coordinated network of regional information centres does not yet exist, nor is there a network for in-service-training. The reasons are the same as those given in chapter 2, namely, insufficient coordination of innovation initiatives in the Nether-

lands and uncertainty about the direction that science education should develop into the framework of comprehensive education.

The lack of such a perspective for a planned and broad innovation - also by chanelling regulations for time tables and examination programmes- is certainly one of the reasons that many uncommitted teachers hesitate before experimenting with the trial material published by SLO. Briefly: the context within which curriculum development must be carried out is unfavourable for increasing the broad involvement of schools, or for coordinating with innovation and with changes in existing regulations.

Linked to the problem description which is repeated in section 4, this means that SLO is able to develop curricula with reasonable success and to involve a group of several hundreds of enthusiastic teachers, teacher trainers and inspectors [experimental innovation]. However, SLO does not have the opportunity to work at planned innovation on the national scale. The consequence will certainly be that a dissemination of ideas from such a project [to be started in 1987] will not be easy to organise. Both from the viewpoint of insufficient opportunities to install a coordinated and pertinent national policy for innovation, as from the viewpoint of uncertainty regarding the future developments in junior secondary education, as a whole.

In some of the SLO projects, some possibilities for solving this problem have been tried, such as:

1. the creation of an ''innovation promoting period'' in which the project participants get an opportunity to explain the publications developed in lectures, articles, regional discussions and other ways of dissemination of knowledge; naturally it is best done in cooperation with teacher training institutes, national innovation bodies and television;
2. the early completion of contracts with commercial publishers of textbooks in order to take care that as soon as possible the ideas developed and tested during the project are available for any teacher in the normal format of textbooks and other materials.

Studies of the dissemination process during the past years [including those of Crandall, Berman and McLaughlin, Van den Berg and Van den Berghe] plus the results obtained by Goodlad [1983] in his investigation of the real curriculum situation in the American high school, and the research for the impact of the work of the former Schools Council for the Curriculum and Examinations in England [Steadman a.o.; 1981] have shown that countries with a traditional freedom in the curriculum and without a strongly coordinated innovation structure have these same problems. A clear solution is not available, neither abroad nor in the Netherlands.

5.3 Publications as intermediary outcomes

SLO's publications policy aims not only at publications in early stages of

a particular development project and thus, publishing things that are not considered to be definite curriculum revisions, but is consciously directed to promote democracy in the curriculum development. At the same time, in order to promote the adoption of new ideas rather quickly, easily accessible and short publications have to be disseminated for brief periods.

Publications are diverse and written for use by smaller or larger groups. Accordingly, they must relate to the very many different aspects of curriculum development that takes place in schools. The outcome is, naturally, a wide cross-section of publications appearing each year [200 to 300] although each will have a restricted clientele, and also that some of them will not be able to bear a full test of criticism.

Risks occur with this publications policy, namely uncertain quality, lack of visibility and short runs, because of the attempt to achieve as much participation, discussions and involvement as possible. Jozefzoon reports some research details about the use of SLO publications and the satisfaction of the various readers' needs. For most teachers' publications are the only way in which they can find the curriculum knowledge, created by SLO.

In the large number of publications, some distinctions can be made which relate to the different levels of use of curriculum knowledge [in the classroom, for planning in schools, or in the national policy] and to the different target groups. We can distinguish:

A. Ideas for the development of a school specific curriculum. Connected with the freedom of curriculum allowed and according to the wish for a stronger dialogue between schoolboards, parents and other schools in the area and the government, there has grown during the past thirteen years a fair amount of agreement that it is a good thing for schools to have each their own school specific curriculum [the Dutch term is "schoolwerkplan"]. Since 1984 it has been regulated that each primary school has to have such a school specific curriculum [the same regulation exists in Denmark]. The small number of secondary schools controlled by the state are regulated in the same way, as are some of the vocational schools.

A general policy line of SLO is that such a development of its own curriculum by the school itself is good, because it encourages better participation within the school and a more planned and considered way of work. In the past years SLO has promoted this development in schools through:

1. The publication of proposals related to the structure, format and degree of detail for such a school specific curriculum. A fair number of crystallised ideas for it are available for primary schools and they have been satisfactorily tested in practice. In 1985 SLO published a guide for junior secondary schools, about which discussions will be held in the coming period and with which experience will be gained for future use.

2. The writing of books, articles and papers by SLO staff members in which much attention is paid to the organization of development work for the school specific curriculum by the schools themselves. In this field, several local and national innovation bodies are very active too.
3. An increasing number of publications with new ideas for objectives, content, and sequence are shaped in such a way that the format complies with the SLO proposals for the structure and the format of school specific curricula and components of them for particular subjects and teaching areas. The objective is to promote easier accessability to ideas for content revision in school specific curricula by the schools. In this field much more work has been done for primary schools than for junior secondary schools [partly also caused by the national debate about a coming transition to comprehensive education].
4. A number of examples of school specific curricula which have been written by schools -sometimes with the assistence of SLO staff members and published accompanied by SLO commentaries, recommendations for improvement and with links to publications with curriculum knowledge.
   Five examples of this nature, for primary schools, have been published; presently the final editing is done for some examples for junior secondary schools. In this field, work is being done in good cooperation with national innovation institutes.

This is certainly a parallel development to the "school self evaluation" and "school based review" suggestions in the USA, UK and Australia. Also, in some regions of France similar developments are in progress.

B. Ideas for choices. The policy line of SLO is that many proposals for the revision of the content of curricula for particular subjects or teaching areas are published. Not only fitting to the published ideas for the structure of school specific curricula, but also to alternative programmes and elaborations written for certain components, or subject- or teaching areas. Different choices that schools can make and suggestions to work out these choices are elaborated in order to help schools to make their own choice.

An example of this policy can be found in recent publications from a just finished project for Consumer Education. Amongst them is a general publication called "You must learn to consume" with an analysis of possible goals and objectives, educational content and practical teaching suggestions, such as those in the existing or usual programmes for geography, economics, mathematics and the Dutch language. In a number of supplementary publications for chemistry, the Dutch language, geography, biology, etc., practical examples of changing the usual syllabuses for these subjects with reference to consumer education are elaborated and different possibilities and choices are shown.

The ideas for curriculum revision with reference to consumer education thus are written in such a way that they can be easily inserted into the existing or usual curricula for schools for certain subjects or parts of subjects. Also, alternatives for different kinds of consumer education are elaborated. It will be clear that this policy is based upon the wish to bridge the gap between the new ideas in the relevant field and their immediate usefulness in schools. This way of working is also a principle of some interest in the framework of the problem description in chapter 4, because it will reduce the gap between curriculum development as such and dissemination.

C. Overall curricula. In the type of publications previously described, there is a rather close link with the existing concepts regarding the format of the school specific curriculum and with traditions of particular subjects and teaching areas in Dutch schools. It is difficult to publish literature in the forms named in sections A. en B. that will be suitable for more fundamental revision of the primary school or junior secondary school curriculum. Such more fundamental concepts have been developed by SLO - based upon more or less theoretical reflection and upon the developments in subject projects such as those illustrated in the connection of the curriculum development for Science Education and the integrated curriculum development for comprehensive education- but these more overall curriculum proposals are published separately.

Such an integral curriculum proposal for the new primary school was published in 1984 and it included as much as possible of the experience gained from the separate projects for teaching in primary schools [maths, science, Dutch, drawing, music, etc.], but this experience was utilised in a new and complete framework. Also, however, here a relatively good link between the proposals for structure and format of school specific curricula was achieved in this overall publication with a curricular framework for primary education.

After earlier experimental publications, a similar overall curriculum frame for junior secondary education, in the sense of comprehensive education, was published at the end of 1985 [see the paper by Labordus]. Likewise, in the last few years curriculum frames for three forms of intermediate vocational education were published. All these overall curricular frameworks are comprised in extensive books. They can be used by schools when they have to build their own school specific curriculum. They are also aimed at the needs of commercial publishers, as well as, examination boards, civil servants, teacher training colleges and school supervisors.

D. Practical examples. A third level of curriculum literature published by SLO [in addition to the curriculum frame level and the level of ideas for use with the development of school specific curricula] comprises elaborated and detailed case studies in the format of parts of programmes that

teachers can follow, inclusive of appropriate teaching materials for pupils. Parts of textbooks, computer programmes, films and such like, can belong to these case studies. The element of developing experimental teaching themes which is sketched by Boersma in the project for Science Education is an example of such material. The experience of SLO, as well as the results of the research for the impact of the curricular proposals [see the paper by Jozefzoon] show that a big demand exists in schools for concrete examples of how to choose from the alternative curricula that are proposed by SLO.

For political reasons at the time of its establishment, SLO is not allowed to work out curriculum concepts completely as ready-to-use materials for schools, like those produced by curriculum institutes in other countries. In the Netherlands there is always fear for state pedagogy and for threatening the position of the commercial publishers of educational textbooks. SLO is allowed to publish, to a limited extent, concrete examples as illustrations of curricular choices as these are developed in SLO projects.

Obviously, here is a dilemma which relates to the problem description in section 4. It seems that exactly the publication of these concrete and detailed examples to a greater extent could be helpful for dissemination of new curricular ideas. Although this point serves as a warning: the experience with the large national projects in the USA in the sixties, as well as the experiences in Western Germany, France and Great Britain with the dissemination of similar ready-to-use material, indicates that perhaps the materials will be purchased, but that they are not always used in the recommended manner! Moreover, such a dissemination strategy is incompatible with the accent that SLO wants to put on the curriculum development by schools themselves.

Two policy models have been developed by SLO that can overcome the tensions met here:

1. In the curriculum publications characterised above, pieces of concrete materials are built in mostly with descriptions based upon experience gained from experimental schools and clearly represented as "a certificate from practice" with protocol texts, photographs, reports of interviews with pupils and so on. In addition, some case studies are available that give examples of how to implement the curriculum proposals.
2. In the early stages of some projects, contracts are made with the commercial publishers in order to help them produce textbooks that comply with the curriculum proposals of SLO. The publisher obliges himself to work out SLO ideas in educational packages for pupils and teachers as closely as possible. Then, the contract defines how SLO staff shall advise the authors of these textbooks and how the publishers shall mention the cooperation with SLO. In the last five years some good experience has been gained from this sort of cooperation. Presently, an experiment is in progress involving a curriculum development project for Social Science in primary schools, in which one SLO

project group advises two competing publishers who are developing two different educational packages, although SLO regards both as helpful in realizing the same curriculum. However, the differences between these two packages are big; one being a thematic course and the other a subject based course.

E. Advice; reflection. In addition to the curriculum literature on three distinct levels, SLO produces a large quantity of booklets or brochures which have the character of:
- advice to the government in connection with new examination programmes;
- advice to the government about the organization of curriculum development;
- advice to school supervisors and staff of national innovation institutes about activities which can be based upon curriculum literature of SLO;
- background information about questions related to curricula [in the area of science education, for example a publication giving ideas about the connections between science, teaching technique and teaching computer science].

F. Coordination between publications. To an increasing extent, steps are being taken to coordinate the great amount of literature that SLO publishes; by means of inter-related series of publications, by its formats, by cross-references to the appropriate publications for different purposes, different curriculum levels and suchlike. Of course, an information policy in the direction of educational periodicals, schools, the press and manifestations is part of this publication policy.

In the field of primary education we increasingly work through training conferences for local school supervisors and teacher trainers, when suitable information about curriculum literature and training programmes is being given, including the way that this literature can be used in innovative contacts with schools.

G. Dissemination through paper? In spite of all this, it remains that by far the most important channel that SLO can use for closing the gap between the production of curriculum ideas, on one hand, and its contribution to dissemination of these ideas, on the other hand, is actually the channel: publishing.

Whilst, it is known from wide experience and research [Yinger and many others] that the planning behaviour of teachers is influenced only a little by publications from outside the school, with which they had no contact during their training, or had not met already in their tradition! To an increasing extent, both in the SLO institute and in the SLO Board, we are worried about the effectiveness of curriculum development efforts in the long run within the framework of this problem.

Although it is clearly seen that good use is made of SLO's work, despite

the relatively short period of its existence -only ten yearssome projects have made little contribution to the improvement of teaching. It is difficult to discover [see Jozefzoon's paper] whether the causes lie in:
- the inherent quality of the published ideas;
- the form of the publications themselves [practice-oriented, concrete, in viting, offering alternatives];
- the publicity [do the relevant parties know the publication?];
- the shortage of implementing the publications in supervision programmes or local innovation institutes; - combinations of these and other reasons.

However, given the factors named in section 2, it is really difficult for SLO to establish other connections between publications and disseminating activities.

5.4 Cooperating with teachers

Certainly, it must be clear from the previous chapters that the work of SLO involves cooperating in many different ways with teachers in the practice of teaching. Both in the preparatory phases of a project, like in the project for Science Education, as well as in the actual experimental curriculum development. Teachers are involved by elaborating ideas for renewal of the curriculum, testing them out in their own classes and then writing about the experience in SLO booklets or so. Sometimes, they do so in cooperation with SLO staff members [as is the case most of the time in the Science Education project]. Sometimes, proposals of SLO staff members are written down and after that tried out by teachers who report the results.

In some projects periodicals are used greatly as communication channels between some hundreds of teachers and others who participate in the curriculum development. It has appeared that a specific periodical dealing with curriculum development for a certain discipline or field can contribute to the dissemination of ideas.

The other side is that publishing and editing such a periodical requires a lot of expertise, time and money from SLO. That is the main reason why SLO does not publish such a periodical within all the projects.

Big differences occur in the manner and the phases of projects with regard to the cooperation of teachers from schools. A few remarks about this topic:
- some projects [primary social science] have contained a period in which the work has had to concentrate on developing a curriculum framework and teachers were only involved in a later stage in discussions and then in working out the ideas in lessons and materials;
- other projects [primary science, audiovisual education] have worked just from the opposite.

It would be going too far to go into detail about the backgrounds of all

these differences; much depends upon the specific situation in a particular school subject and the section of the educational field. Our experience is that most teachers prefer participating in the development and testing of concrete lessons and ideas; more than in the design of programmes for longer periods or in discussions about curriculum frameworks.

5.5 Inherent relations in content

In section 5.3., something was said about the three levels of "curriculum knowledge": classroom practice, school specific curriculum and curriculum framework. On all of the three levels there are inherent relations within the planning of the different aspects of teaching and thus also in curriculum development. These relations relate to at least two aspects:

a. The planning of topics in the curriculum for different areas or disciplines [e.g. "energy" related to science, technology and social science] and the points of time and methods of treatment [exploration, context bound, in application situations].
b. The attention to "integral aims" as for example "learning to cooperate", or "learning to work in orderly fashion" or "teaching international understanding", etc., in the different curricula and in classroom practice.

A key to the notion of "schoolwerkplan" [school specific curriculum] is that good coordination of the learning and teaching of different objectives and contents -and often by different teachers!- can be improved if the school has one coordinated plan in which the inherent relations have been worked out. The overall curriculum for primary schools, mentioned already: "Curriculum offering for primary education" [Kuiper, W., J. Letschert, R. Gorter; 1984] gives a basis for this coordination of content and action by:

- working out a fairly precise relationship between the integral aims and the curriculum components per subject area;
- a clear presentation of subjects, contents and accents in the cells of a matrix, in which the teaching areas and the three periods of primary education [4-7-, 7-10, 10-12 years] are coupled together.

That work could only be provided by a close cooperation between the different subject projects for curriculum development in the primary school [maths, language, science, music, English, drama, etc.] and the coordinating group.

On the level of examples of school specific curricula this intensive working out of the relationships has been less successful; up till now some good results have been obtained at the level of classroom practice planning. The situation is much the same for secondary education.

Although, probably, greater efforts within SLO have been directed at this aspect than in other curriculum development institutes; and although this search for coordinated development -instead of doing isolated sub-

ject projects- has formed a powerful impulse for the founding of SLO, the elaboration of this principle in daily practice of curriculum development has not been very simple.

6 Inherent pressures

It will be clear to the reader that no easy solutions are possible for SLO in order to overcome the problem described in section 4. The primary characteristics of SLO's policy - that is practised flexibly by setting out curriculum strategies for the different projects - indicate already by mutual comparison and by confrontation with the Dutch context a number of inherent pressures and conflicts within SLO's work. In this section, I want to try and explain some of these pressures and conflicts.

6.1 Curriculum development work, like that which we want to do within SLO, requires a period of tranquility; long-term planning in connection with development work, formative evaluation, preparation for implementation and dissemination requires a plan for a number of years without heavy interruptions. On the other hand, there is a continuous desire to adapt to the changing patterns of needs of teachers and policy-makers which appear from the contacts of SLO with advisory committees, publishers, the Board and the news media.

Through the system of biennial plans, this changing situation can be accommodated; but not always and completely. For example, the government's policy for Junior secondary education is not very clear and several times we have had to change our direction; especially, in particular subject areas. This problem presented itself not so strongly in the Science education project for Junior secondary schools; very strongly, however, in the development of the curriculum framework for Comprehensive education; as well in the projects for General Techniques and Orientation for Modern Languages.

These circumstances lead to a tendency to be somewhat cautious when making important decisions that involve the choice of priorities for curriculum development in both general and specific projects. The outcome is that, again and again, discussions have to be arranged and compromises must be reached about the course that projects have to take. This consumes a lot of time and requires creativity on the part of project participants, heads of department and directors.

6.2 There is a straightforward desire by SLO staff to develop curricula that fit to the innovatory profile of the groups of teachers in certain sectors of the Dutch education system [Leithwood, e.a., 1983]. On the other hand, it is very difficult in the Netherlands to conduct coordinated research into the innovatory profile of a group of teachers, by an institute for educational research; by educational inspectors; or by the policy department of the Ministry.

SLO cannot perform such research itself and has relatively little opportunity to initiate any coordinated research work. This problem can only be solved by the system of project preparatory stages aforementioned, in which all the signals and symptoms are intercepted and incorporated, as far as possible. Just as in other countries, it is not easy to formulate lucid ideas about the need of a revision of the teaching system, on the grounds of research in education and society. The discussion in the USA about the many reports on complaints concerning the desirable revision of secondary education [see amongst others, the review of the reports of Gardner, Adler, Goodlad, Boyer a.o., in Passow 1984] point to the same problem. The outcome of this pressure is a certain wish by SLO to satisfy all the needs of different groups at the same time, and to stay on the safe side.

6.3 It is difficult to realize the wish of SLO to combine curriculum development activities with the adoption and dissemination of ideas within the framework of the Dutch education system. This is largely due to the impossible task of coordinating the curriculum development closely to the activities of the teacher training colleges; the in-service training units; the commercial publishers of textbooks; as well as, the regional and national supervisory and innovation organizations.

Occassionally, some successes have been recorded but in many projects too many activities at the same time have to be done. Unfortunately, this spread of attention and activities has as its consequence that the progress of developing a new curriculum and of disseminating it, is rather slow.

In some projects, these pressures are aggravated by the absence of a necessary policy from the Ministry of Education and Science and this only makes the problem worse. A good example concerns the project: "General techniques". As a result of a request from the minister, in 1982, a curriculum proposal was produced for this new area for the first two years of Junior secondary education. The objective was to lay down regulations for it, by the ministry, and to decide a very detailed innovation policy. Only in the summer of 1984 did a subsequent minister bring out a rather withholding circular that gave schools some opportunity to incorporate this new subject area into their curricula, for which some finances were made available. A compulsory regulation of in-service training however, did not come about. In fact, six months later, the circular was rescinded, as a result of other problems related to the complete revision of Junior secondary education! Naturally, such a situation had grave consequences for the completion of this SLO project and shows that it is almost impossible to plan curriculum development work in relation with other bodies.

6.4 SLO tries to support curriculum development work with research and

evaluation within the framework of experimentally developed material on the three defined levels. In addition, within the framework of experimental implementation in circuits of 50 to 100 schools, where further tests with the developed curriculum can be carried out. Finally, research has to be done for the effects of SLO's preparatory activities with regard to the dissemination of new proposals.

Also here, pressures exist due to the lack of opportunities for organizing such research and evaluation by independent institutes and universities, or by the coordinating institute for education research in the Netherlands. In a number of areas, reasonable coordination has been created, but not in some others. Consequently, in a number of curriculum development projects initiated by SLO, we have to rely on the limited experience from small groups of schools, or on the impressions of participants, teachers and inspectors. Therefore, too many discussions are based upon "opinions" rather than "hard facts". This situation is not conductive to a systematic development of curricula. Fortunately, the coordination with projects for curriculum research and evaluation has improved over the last three years; these projects are performed and financed by other institutions, but are linked with SLO-projects.

6.5 The attention of SLO is focused on the needs of different sectors of the education system and it appears that these needs are very diverse, but it is difficult to weigh them one against the other [see chapter 6.2]. The outcome is that the personal views of SLO staff members, or certain members of the Board, or the person who dominates an advisory committee, easily get the upper hand.

Alternatively, any compromise becomes too vague for controlling a project satisfactorily. In the latter instance, nobody is happy and continual friction results, so that project plans are rejected or only the essential parts are elaborated. I can point to some SLO projects that have suffered continually from criticisms which have delayed progress unnecessarily. This has deflected attention from the long-term objectives [see 6.2].

6.6 The principle of working with a widely diversified publication policy rests upon the wish to satisfy the needs of different groups, but the image of SLO is strained if everybody has different opinions concerning the work of SLO. It follows that the "success" of SLO work is not very consistent. Apart from a few large projects; generally, when many target groups are involved, it is difficult to know what the different groups think about SLO's work.

The question of civil servants and others who provide the finances, concerning the actual impact of SLO's work, is easy to answer where certain parts of the work are concerned [this has been investigated - see the paper by Jozefzoon], but not so easy when it comes to the general impact. Experience in England with the Schools Council [see Plaskow; 1985] and in Canada [Gage, Hus-173-n, Singleton; 1980] showed how

important it is that a curriculum development institute like SLO gives clear evidence of its successes in the form of effective educational innovation over a reasonably short term. It is difficult for SLO to steer a course between the principle of serving very diverse and often small target groups, on one side, and the wish for a clear general identity, on the other side.

6.7 The express desire of SLO to find a good connection, during the development process, between the different projects and publications causes friction with the wish to work for specific target groups. For example, there are many teachers who are not interested in publications that deal with "school-specific curricula" proposals, although they are definitely interested in concrete recommendations for lessons and teaching materials. Such items are also published, but normally, as part of a "school-specific curriculum" approach.

The second tension that comes from this dilemma is that SLO's management sometimes finds it difficult to coordinate the developments in different project groups. Cooperation requires understanding what everyone is doing, discussing alternative choices and deciding how to publish the results, etc.. This all takes time and requires skill in order to search for compromises and to create an institutional culture. Although successes have been recorded, it still appears that the internal SLO policy decisions, again and again, lead to problems and tensions within the institute and in relationsships with advisory groups, supervisory committees, the Board and departmental staff.

Up to now, these pressures and conflicts, of which the existence is recognized by most of the SLO staff involved, have not led to any change of policy with respect to the most important principles of curriculum development, like these are expressed in chapter 5. More accent has been placed, in the last years, on the information policy in the direction of the whole education system via the education press; on contacts with and information of civil servants, members of parliament and the government, inspectors and general opinion leaders in the press and politicians. Also, within the institute and among the many people involved in committees, the board and suchlike, discussions about a stronger connection with dissemination activities and with the development of concrete material that is immediately suitable for use in the classroom, become stronger.

7 Information about succes

In the research report already mentioned, of Gage, Hus-173-n and Singleton who looked for the impact of the Ontario Institute for Studies in Education [OISE] [1980], it is suggested that 15 years is not long enough to

produce measurable improvements of the teaching in schools. Whilst, Jozefzoon's text records the impact of SLO publications over the past ten years. Such an enquiry is difficult to perform, especially, when it is concerned with measuring the effects of teaching activities on pupils. But also, determining the actual use of ideas from SLO literature by teachers in their planning and teaching, is rather hard without intensive, large-scale classroom observations.
Nevertheless, it appears that:

- the name and function of SLO is well-recognised throughout the Netherlands by teachers;
- the education press is paying increasing positive attention to SLO publications [about 400 reports during 1985];
- some subject areas are markedly influenced by SLO ideas, to perceive in textbooks of the commercial publishers [English, economics, electricity];
- some subject areas are clearly affected by SLO's work in relation to government policies [examination regulations, in-service training, money for laboratories]; particularly, general techniques, Dutch, economics, chemistry, electricity, mechanics and social studies [all in secondary education];
- SLO project groups are being increasingly involved with shaping the opinions of teachers' associations, teacher training staff and local innovation bodies.

Still, there are big differences in school types and subjects and it is not easy to connect these differences to the various circumstances in the related part of the education field, or to the different conditions attached to strategies for the different project groups.

8 A solution for the problem?

In section 4, the problem was stated of the principles and procedures which a national institute for curriculum development can use for creating "curriculum knowledge" in such a way that this knowledge really contributes to the improvement of teaching in schools.
It is clear from the preceeding chapters that the answer of SLO cannot be given in one or two sentences. In essence, SLO tries to work within the boundaries of its rather narrowly defined task descriptions in its "terms of reference", but, at the same time, tries to connect curriculum development work with the coordinated activities of adoption implementation - dissemination. As far as possible, SLO does this through contacts and cooperation with other institutes and groups. That answer is expanded in section 5 into five general principles that are illustrated with some procedures which SLO uses to operate them. Unfortunately, they are not without their problems [see section 6], but some tentative successes have been recorded [see section 7]. Answers can be formulated directly

as pointers for actions, too.
Summarising, but really in general terms:

8.1 Try to bring out publications which target groups can recognise as "quality"; that is to say: as new ideas for their use. Consequently, these ideas will be acceptable if described in such a way that they can be used in varying practice-situations.

8.2 Provide information regularly for as many different groups as possile, so that they become familiar with the available curriculum ideas.

8.3 Promote thinking in terms of "school-specific curricula" by means of suitable publications and other actions; the existence of a tradition in schools in this field is very beneficial for acquiring new ideas for the content of the curriculum and, in this sense, the promotion of thinking about "school-specific curricula" can be a useful condition for revising the content of curricula.

8.4 Care for the reputation of SLO's name through positive publicity [publications, telephone behaviour, making contacts, etc.].

8.5 Avoid a one-sided institutional philosophy on controversial issues [for example, viewpoints on integrating subjects, comprehensive education and suchlike] in order to prevent that SLO becomes a party, as an institute, in divisive discussions. However, care should be taken to publish clear viewpoints as far as elaborating the tasks and ideas in a particular project.

8.6 Try to promote that the different target groups have a good insight in the performance of SLO's work and in the backgrounds of its priorities selected by the Board.

Whether the direction taken by SLO regarding the problem of the relationship between the development of curriculum ideas [as the heart of SLO's duties] and the implementation and dissemination of them in the education system [not an own task of SLO] is the correct one, probably, cannot be said at present. From the history of innovation and the roles played by curriculum institutes in that history, it appears that many of these instites [Regional Laboratories in the USA, the Schools Council in Great Britain, HILF, SBI, IPN and IDM in Western Germany, INRP in France, NBE in Sweden, KEDI in Korea, etc. etc.], after above fiteen years in existence, have come to problematic situations. Also, it seems that many of these institutes claim that they get a clearer task in the field of dissemination. However, there is also a strong connection with the specific circumstances in the associated education systems. Although curriculum development institutes can learn much from each other, this only ap-

plies if the specific circumstances under which the institutes have to work, are considered well. The Far West Laboratory in California, for instance, operates in a completely different situation compared with the SBI in Bavaria, West Germany. Presently, the solutions developed at SLO seem to be valid for the Dutch situation; perhaps, in eight years or so, we will know more ....

Ivar Labordus

3 Curriculum development between school practice and legislation: the junior secondary education in the Netherlands

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1. Introduction

1.1 Subject of this paper

Can curriculum development - carried out by a national institute for curriculum development - contribute towards the innovation of an education system? Which conditions influence this and what kind of impediments and problems arise? What can be learned from the experiences and findings of the Dutch National Institute for Curriculum Development [the SLO] with respect to the question for the future?

In this paper a case description of a large-scale curriculum development project in the Netherlands is presented. This project explicitly finds itself between school practice and national policy [and legistation], namely the development of a curriculum for an integrated or comprehensive junior secondary education. Central in this description is the question of the way a national institute for curriculum development can contribute towards innovations on a national level and, conditions which are of importance in this.

1.2 Structure of the paper

The paper is built up as follows: In the second chapter a global characterization of the Dutch education system anno 1975 is presented. This description shows the educational context within which the development of integrated secondary education takes place. Characteristics of this is that the Netherlands has a dual education system with a strong division between the educational goals and contents of general secondary education and those of lower vocational education. It is obvious that there is a high - and from the point of view of equal opportunities, an undesirable - correlation between the type of school chosen and social background. In addition the system is not very effective. This is apparent from the long school careers and the proportion of examination failures. In 1974 a large-scale national innovation was started aimed at the development and implementation of a system of integrated secondary education.

The third chapter describes the innovation which the Minister of Education had in mind in those years, and within which the implementation of the curriculum development was to fit. A description is given of a long-term strategy to be developed, within which curriculum development also has a place. The strategy for curriculum development is adjusted to the general innovation strategy. An indication of the type of materials used and to what purpose, is presented. The curriculum development strategy is characterised by its school-tied and school-oriented working methods. In general: a largely inductive development strategy.

The fourth chapter describes how the curriculum development strategies were carried out and which products resulted from this. The school-

tied and school-oriented development strategy produces a large variety of small products. At a certain moment this situation calls for consolidation and convergence. Curriculum development within the Foundation for Curriculum Development plays a part in this.

The fifth chapter describes how an innovation strategy changed dramatically from being a strategy with an emphasis on collaboration between and with schools, to a strategy with an emphasis on managerial deliberation and governmental decisions, and also the effects this had on curriculum development. The Foundation for Curriculum Development [SLO] was charged with the important task of developing a curriculum for integrated secondary education within a framework designed by the central government. The development strategy, then, to a large extent, gets a deductive character.

In chapter six some unsolved problems are discussed. Some reflections have been included in the description.

2 Characterization of The Dutch Education System

2.1 The Dutch education system

The structure and content of secondary education in the Netherlands anno 1975 was largely determined by the introduction of a new coherent legal framework in 1968. Historical developments in the Netherlands after the Second World War gave rise to a differentiated school system which, in principle, can be divided into two main categories. One part of the system offers general education with a strong accent on humanities, this type of education is meant to provide a basis for, and introduction to, further studies. The other part of the system offers a differentiated scala of vocational training on different levels.

In 1968 the whole system was brought into a new legal framework which led to the following structure.

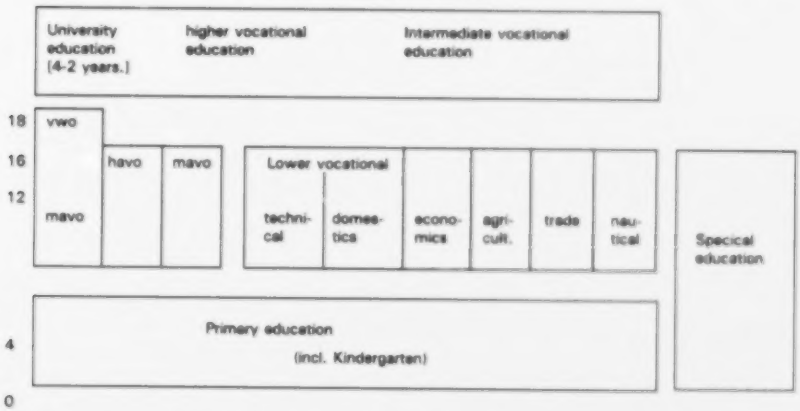
A. **Primary education**. Two years "Kindergarten", which is not compulsory [but which is in fact attended by 90-95% of all children for at least one year], followed by six years primary education. These two school types were from the date of August, 1985, amalgamated. Roughly the same rules apply for all schools with regard to the content of education. These are only global rules however, and therefore it is possible for schools to adjust to local needs and possibilities.

B. **Secondary education**. Secondary education can be divided into two main categories, which, as far as the content of the curriculum is concerned, are very different: lower vocational education and general secondary education.

B.1 **Lower vocational education**. There are a number of forms of lower vocational education*. The length of courses in this type of education is in principle 3 or 4 years [upto the age of 16; the end of compulsory full-time education]. There are technical education, domestic science schools, economic and administrative education, agricultural education, trade schools, nautical education. Technical education forms by far the largest sector, and includes a number of specific departments [building, metal, electronics, mechanical engineering, and consumer technology].

B.2 **General secondary education**. In addition to this differentiated scala of vocational courses, there is also a general secondary education system which also has several sub-systems offering courses of 3, 4, 5 or 6 years in duration. This system of education for 12-15 year olds respectively 18 year olds fits into a wider system which also includes higher and university education.

DIAGRAM OF DUTCH EDUCATION



This diagram shows only a part of the Dutch education system - and is detailed. It does not include the whole field of adult education. It suggests that everyone leaves school at the same age - this is not the case. In the Netherlands full-time compulsory education ends at the age of 16. Secondary and higher vocational education offer courses of various lengths*.

Some figures: In 1982 approximately 1,240,000 pupils participated in secondary education of which 405,102 were in lower vocational education and 836,220 in MAVO/HAVO/VWO. It appears that a strong class-related factor plays a role in the choice of schools after primary education. The higher social classes are highly represented in general secondary education [which has a longer duration]: while the lower social classes often opt for lower vocational education.

* See for the various forms chapter 7 in this book.

Vocational group	Boys [B] Girls [G]	School categories 1	2	3	4
higher employees	B	2,7	3,6	45,9	42,9
	G	1,5	3,8	52,1	42,8
middle class	B	2,9	15,3	49,4	32,4
employees	G	2,8	12,6	53,3	31,8
lower employees	B	3,9	20,1	53,3	22,7
	G	3,5	17,0	56,8	22,8
business people	B	5,1	25,3	47,4	22,1
with personel	G	4,2	16,9	54,5	24,4
business people	B	3,2	40,5	41,7	14,6
without personel	G	3,2	27,6	54,0	13,2
labourers	B	3,2	48,5	37,6	10,7
	G	4,5	35,8	47,8	11,9
others	B	4,1	48,5	35,9	11,5
	G	4,8	41,0	42,7	11,5
Totals	B	3,5	35,1	42,2	19,2
	G	3,8	26,7	49,7	19,8

Figure : Schoolchoice After Elementary Education, by Vocational Grouping and Sex [B/G].

Remarks: 1] Lower administrative [vocational] education
2] Lower technical [vocational] education
3] Junior secondary education
4] Pre-university and senior secondary education

The content of education is in a global sense determined by the central government. The regulations with regard to secondary education are related to*:

- the subjects to be offered;
- the time table hours;
- examination requirements for a number a subjects which are examined centrally at the end of the school period.

In addition there are a number of regulations with regard to the training and in-service training of teachers etc. We will however not go into these**.

Within the framework of the regulations already mentioned, schools are free to organize their education at their own discretion. For this reason it is not really possible to give precise general findings with regard to the actual education individual schools offer.

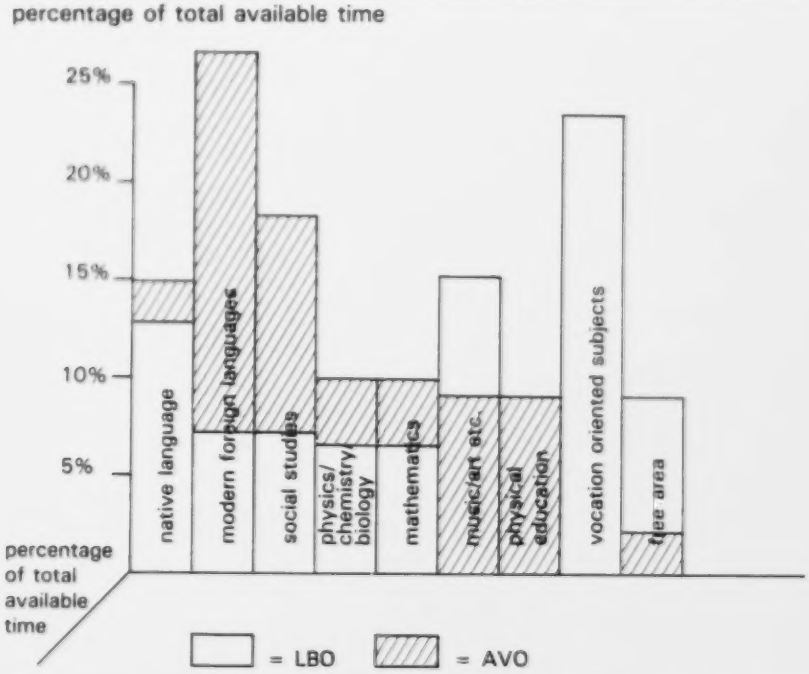
* This may be arranged differently for other parts of the system, but we will not go into this here.

** See chapter 7 in this book.

A brief glance at the regulations with regard to the subjects and timetables does however make certain differences very clear.

The diagram below shows the division spread out over several academic years [the regulation is in fact a little more specific], divided into percentages of the total available time in education:

	general secondary education	lower vocational education
native language	15%	13%
modern foreign languages	27%	7%
social studies	18%	7%
mathematics	10%	6%
physics/chemistry/biology	10%	6%
music/art etc.	9%	15%
physical education	9%	15%
vocation oriented subjects	-	23%
free area	2%	8%



N.B.: These percentages are only rough estimates. They do not show that the various school types have a different duration [4, 5 or 6 years] and that pupils can influence this, by means of the "package" they choose!

2.2 Characteristic differences

A short analysis of the data shows some typical differences.
a. The most striking is the strong accent in lower vocational education on technical and practical subjects and the great lack of these in general secondary education.
b. The second conspicious element is the duration of the courses, which varies from 3 to 6 years. This implies that some youngsters are assumed to be ready to enter the labour market at the age of 15-16, while others do not leave secondary education until they are 18 years of age, and then often go into higher vocational education or university education.
c. Not evident from this data is that the didactical ideas in lower vocational education are different from those in general secondary education. The vocation-oriented practical subjects are often taught by teachers who have experience in this type of work. The didactics have a strong practical character in most subjects. Especially in the technical and vocation-oriented subjects there is much room for practical work with materials and tools. The didactics in general secondary education have a very traditional character in most subjects. In lower vocational education the so-called general subjects are often taught by one or a few teachers. In general secondary education however the normal pattern is that there is one teacher for each subject.

The actual content of education is determined by a wide range of factors. In lower vocational education the business world has a great deal of influence on vocational subjects - by supplying teachers, and they also influence teacher training courses to some extent. The content of general subjects, in lower vocational education as well as in general secondary education, is to a great extent influenced by central examination requirements and examination syllabi. In addition the differences in course duration also determine the extent to which the content is influenced by examination requirements in the first two or three years. It is impossible to indicate the exact relationship between examination requirements and syllabi and the actual education offered. It is generally assumed that examination requirements determine the content of education in the 2-4 years prior to the examination [depending on the course]. This to a large extent determines the amount of freedom teachers have to experiment with the contents. There is more freedom in the lower years than there is in the upper years.

The above summary of characteristics of the various types of post-primary education in the Netherlands is meant, in particular, to illustrate that the choice made by 12-13 year olds and theirs parents, is by no means without consequences. Because of the different subject "packages", the different priorities and the different didactical methods, it is

* See for these abbreviations chapter 7 in this book.

not easy to go back on an earlier decision. It is possible however - and this often happens - to change from VWO to HAVO from HAVO to MAVO, and from MAVO to LBO* [the differences between these schools are found in a comparative decrease of theoretical orientation. HAVO being the most theoretical]. The other way round is much more difficult.

This finely meshed system of secondary education, designed after the Second World War, and laid down in the 1968 Compulsory Education Act, tries to accommodate each pupil's wishes and possibilities. This checkered education system links up with the checkered social needs for education and training.

2.3 Decategorisation

The system also has some negative side effects however, which were unintentional. Two of the most obvious are: a. There appears to be a strong correlation between the choice of school and social background. It is also clear that this relationship cannot be corrected within the school system. At the initial choice it is apparent that there is an overrepresentation of the lower social classes in lower vocational education, and an overrepresentation of the higher social classes in the HAVO/VWO schools. This over-representation remains over the course of a school career. b. Another unexpected effect is that more than half of the youngsters do not get the diploma from the school for which they originally choose. That is to say that many youngster follow an indirect route to the end of their education.

The system, as described here, has to a large extent got its shape from the new law on secondary education of 1968. Since then many new developments have obviously taken place. A number of these can be placed under the heading "decategorisation":

1. **"Transition" year/orientation phase**. The so-called "transition" year had already been introduced in the 1968 law. This meant that all schools had to be organized in such a way that the first year at school could be an orientation for later years, thus enabling youngsters to delay their definite choice until the end of that year. This starting point has been postponed and many school now keep pupils together for at least two years, before they have to make a definite choice.

2. **Multi-lateral schools**. In 1968 the various types of schools mentioned were largely housed in separate institutes. A development is now under way which brings different types of school together in one school organization. This leads to larger schools; the possibilities for changing from one school to another are increased, because the curricula of the different school types have been harmonized and are better attuned to each other. There are also fewer thresholds for pupils wishing to change from one

school type to another; it can all take place within the same building and within the same organization.

3. **Generalization of the content of education.** In lower vocational education the content of the so-called practical subjects is getting broader, i.e. less job-specific. This is also meant to put off the moment at which a definite choice has to be made for a certain type of vocational training. In addition lower vocational education is [as a result of this] functioning more and more as an alternative didactical route. That is to say, that more pupils opt for lower vocational education not so much because they want vocational training, but because the didactical approach offered is in line with their needs and style of learning. In general secondary education there is also a tendency to give substance to the finely webbed structure already mentioned in the form of differentiations within schools rather than in separate schools.

4. Recently developments have been set into motion to merge the MAVO and VWO [see diagram] and to form a new type of school with internal differentiation [the Lyceum].

2.4 Conflict

Secondary education in the Netherlands has been the subject of heated discussion and conflict. This has been the case since 1968, but especially over the past ten years, discussion and conflict have at times been heated. Three elements are central in these discussions:

a. unequal participation in education in relation to social background, the ratio boys/girls, and in relation to pupils from ethnic minority groups;
b. the unbalanced division of attention to cognitive, technical and social aspects of education and,
c. the tasks of the school.

We have already indicated that there is a strong relationship between school choice and social background. In addition education also creates unequal chances for boys and girls which only leads to an undesired confirmation of the role patterns. In the present form of education, minority groups also have too few opportunities for development. These problems are not typical for the Netherlands, but are also present, to a certain extent, in other European countries.

In Dutch education more and more tasks are constantly being added; not only new subjects such as new information technology, but also new formative elements such as sex education, consumer awareness, road safety education, development studies, and so on. The discussion concerns the question to what extent the school as an institution can be held responsible for these tasks, and what the consequences would be for the content of education. Government documentation has also established

that the link between education and the outside world is insufficient. The content of the education offered is insufficiently attuned to the world for which education has to prepare pupils.

In the outline of the education offered we have already emphasized the differences in curricula of lower vocational schools and general secondary schools. During the seventies yet another objection arose against the forms of education offered in the different types of schools - and over emphasis on the cognitive development and too little attention to the social development of youngsters. Moreover, the fact that in general secondary education no attention is paid to the cultural phenomenon "technology" is increasingly being seen as a drawback.

3. Innovation of the Junior Secondary Education

3.1 The development of the middle school

In 1974 a national project was started by the government to look into the possibilities of introducing integrate or comprehensive junior secondary education, which could offer a solution to some of the problems described earlier in chapter 2, especially with regard to the social background factor and the large number of wrong choices made by youngsters, which is apparent from the great number of indirect routes being followed. The content of education offered should be more pupil- and society-oriented.

"Pupil-oriented" means here that there should be more room, than there has been in education, for pupils' own contributions. This not only refers to more "open" didactics: [i.e. more room for the active involvement of pupils as opposed to the usual passive approach], it also means a greater involvement of pupils in the choice of goals and contents. This movement fits into the large democratization wave at the end of the sixties.

"Society-oriented" in principle includes in this context two aspects:

1. in the choice of contents more attention should be paid to the relevance of those contents for the [future] social functioning of pupils;
2. in the choice of contents more attention should be paid to societal applications of the contents, this can increase pupils motivation. "Society-oriented" also means that some contents should be more critical of society.

These two major changes, which could be described in more detail, are [a] the structural change of the categorical system into a comprehensive system **and** [b] the innovation of the contents of education.

After parliamentary approval a national innovation project was initiated by the Minister for Education and Sciences. The aim of this project was to determine whether a system of comprehensive secondary education is desirable in the Netherlands, and how this can be realized. Schools

are, by means of a circular, invited to enrol as experimental school. About 120 school react. After a certain intake and preparatory period, 14 schools are selected. The criteria for selection are: the history of experiments in the school, the spread across the country, and the spread across school types. 33 schools are invited to act as sound-boards.

3.2 Principles for the innovation processes

A number of principles laid down by the government form the basis of the experimental process in schools, these are decisive for the development. These principles are formulated as follows:

- both general and vocation-oriented education are followed by the whole yeargroup of pupils, regardless of ability, social class, sex or results;
- education is organized in such a way that the actual choice for further studies and profession is delayed until the age of 15 to 16;
- education is organized in such a way that it follows-on from primary education;
- the education offered is broadened by a better spread of subjects and subject areas;
- education offers suitable learning situations for individual development and social awareness.

These principles in themselves, do not form a breakaway from developments already taking place in different parts of education. Their interrelationship does however point to a rather radical [new] structural innovation of the content of education. This is why a careful innovation strategy is being considered, in which experiments are carried out on a small-scale in individual schools over a period of several years.

3.3 Innovation strategy

In 1975 the innovation strategy was mainly based on the following points:

1. During a so-called **construction phase** of 8 to 10 years experimental schools would carry out the concept of comprehensive junior secondary education.
2. In a second phase, the so-called **transfer phase**, which in turn would last for about 10 years, a new law on comprehensive education would lead to the implementation on a voluntary basis.
3. Another ten years later, the third phase would be introduced - the general implementation.

The parliamentary agreement, on the basis of which the Minister for Education was able to start the project, only applies to the experimental phase. This means that parliamentary approval only covers research into the desirability of integrated secondary education, via school experi-

ments. This partial parliamentary approval has given rise to a number of problems. In the aims of the innovation process the idea that integrated or comprehensive secondary education would replace the current categorical system has always been central. The aim was not to develop it as an alternative system, as is the case in England.

In these different phases of the innovation process room has been allowed for professional support throughout the process, this includes curriculum development. Curriculum development as a professional activity was assigned the following three tasks for the first phase of the innovation process - the contruction phase. These tasks were:

a. Support of individual experimental schools. This help consists of supplying ideas with regard to development within and innovation of different subjects. These are ideas with regard to desirable [new] ideas on the content of subjects, the didactical approaches to them, the relationship between the content of different subjects, etc.. In addition the help consists of supplying ideas with regard to curriculum development activities. During this phase of the innovation process the individual school is the core of the development; teachers themselves develop the curriculum for the school; they are given some "free" periods for this. The project team of the Dutch National Institute for Curriculum Development, which consists of nine people, acts as external support agent in this internal development work.

b. The transfer of ideas and the improvement of cooperation between schools. One of the aims of the external support by the National Institute for Curriculum Development is to improve the cooperation between schools with regard to curriculum development and creating the right conditions for exchanging ideas. The support in curriculum development consists, to a large extent, of the coding and publishing of curriculum development experiences within schools.

c. Fulfilling a mediating function between experimental schools and the government. By means of the coding and the collection of curriculum development experiences and ideas, the government can be advised on regulations which should make the implementation of comprehensive education possible.

4. Innovation of the Junior Secondary Education and Curriculum Development

4.1 Curriculum development within a project group

The Dutch National Institute for Curriculum Development [SLO] started a project group which is responsible for the tasks mentioned in 3.3. It is an inter-disciplinary group, consisting of two educationists and seven subject or material experts [former teachers] for the different learning areas. This group has to carry out the tasks described. The instructions

for the project group come from the Minister of Education on the advice of an independent advisory commission. All work plans have to be presented to the Minister for approval.

Comment. How independent is the Dutch National Institute for Curriculum Development as far as the acceptance or refusal of these instructions is concerned? The Dutch National Institute for Curriculum Development [SLO] is an independent organization. It carries out curriculum development projects, which have been requested by the educational field. The budget comes from the Minister for Education. The managing board of the Foundation for Curriculum Development determines the policy. The SLO is however less independent in some projects than in others. In the case of integrated or comprehensive secondary education it is clear that the Minister also determines the policy with regard to curriculum development. The managing Board of the SLO can refuse to carry this out, but then immediately jeopardizes the available budget. Right from the start this had been one of the main areas of concern surrounding the project.

The managing board has not been charged with the task of assessing the relevance of the content of the curriculum development work in this case the Minister keeps this task.

The managing board of the Dutch National Institute for Curriculum Development can only really refuse instructions from the Minister if these instructions form a threat to the institute's survival, for example, if a project is so controversial that by participating in it, the Institute would become involved in a societal discussion about desirable changes in the education system. But although the managing board is not presumed to have an opinion on the desirability of, for example, integrated or comprehensive secondary education, [see also Van Bruggen's paper], the opposing social views surrounding integrated or comprehensive secondary education are reflected in the board. Every plan of execution and each publication of any importance, produced by the project group, always leads to intensive discussions in the board. From this it is clear that curriculum development in the context of a national innovation is not just a technocratic activity, but that it is also strongly subject to political pressures.

4.2 The working methods of the project group

The project group consisting of nine people - in line with the principles of the innovation strategy - in particular works in cooperation with the fifteen experimental schools, in different parts of the country. Two characteristics are central in the method of the project group: school-related and school-oriented activities. The activities of the group are school-related because the development problems of the individual ex-

perimental school are identified and attempts are made to solve them. The task of the experimental schools is, in the first place, to show how integrated secondary education can be realized. The support of the curriculum developers is based on three cornerstones:

- The didactical and pedagogical expertise attained. The project members [nearly] all have several years of experience in education, supplemented by a study of [pedagogical] literature;
- the study of curriculum development strategies and such like. Admittedly not much attention has been paid to this study; the group was driven by the external developments and the many requests for help by schools;
- the so-called mediating function. Because of the ambulant nature of the work the curriculum developers are able to pass on information about possible solutions from one school to another.

The activities of the group are school-oriented. That is to say that the group does not intend to publish its own curriculum products. The results of the work must become evident in the experimental schools and from the reports produced by the schools.

Comment. How sensible is the project groups option for this school related and school-oriented approach? During this phase experiments in schools have two functions:

- to develop integrated secondary education for the school population itself;
- to show the government that integrated secondary education is desirable and indeed possible.

This innovation strategy within which some schools demonstrate the project to the whole education system and the general public, leads to a strong isolation of the schools involved. This is also known to be the case in other countries [namely West Germany]. The schools - and the external support agents involved [for example curriculum developers] then feel that they are in a vulnerable position and resort to each other for comfort in fairly strong groups with a certain resentment towards external influences. This polarization between the middle school experiments, on the one hand, and, the ongoing more gradual developments in the existing education system, on the other, has also found its way into [the organization of] curriculum development.

There is little contact between the members of this project group and the members of the other groups of the Dutch National Institute for Curriculum Development [who are often involved in the same subject area as one of the members of the project group for integrated or comprehensive secondary education]. There is for example hardly any contact with the members of the project group for science education for 12-16 year olds. The reason for this is not only the isolation mentioned earlier. The projects for the subject areas also have another basis for cooperation with schools: in these projects the schools take part in

curriculum development on their own initiatives; in the middle school project the curriculum development work was usually an additional task for the experimental schools, which they themselves had not asked for. The experimental middle schools always experimented as schools as a whole; all aspects of the education system [all subject areas, but also the existing forms of organization with regard to student groups and so on] formed part of the experiment. These differences in the design and tasks of the projects do not make cooperation any easier.

The school-tied and school-oriented curriculum development work has lead to a lot of so called "grey" papers. Descriptions of the education in experimental schools with regard to the new contents, working methods, student guidance etc. have been drawn up. These descriptions are not meant for general publication. They are discussion papers for the school concerned and are also used as discussion and illustrative papers at conferences held for the experimental schools and a small group of schools [33] which act in response. These conferences are organized fairly regularly [once or twice a year] for each subject area. The most important aim of these is the transfer of expertise from one experimental school to another and to get feedback from individual schools on the solutions they applied to their problems.

Comment. What is the function of these "grey papers" [these documents which are not to be published on a large scale]? The "experimenting community" particularly seeks support within its own circles to strengthen the transfer and to legitimize the solutions found. Relatively few of the published results of the development and innovation activities are published or discussed in the general pedagogical field.

Political changes have probably also made it more difficult to have discussions on the basis of published development results. As a result there is a fair amount of pressure from the schools involved to keep the written products as much as possible within the 'experimenting community" for "personal use" and not to expose the work to criticism from outsiders. The outsiders will probably not only attack the content proposal, but also the experimental system itself. After 4 to 5 years of experiments in individual schools, in which curriculum development has adopted a school-tied and school-oriented approach, the lack of a legal basis is becoming increasingly serious for the schools.

Parents are becoming more hesitant about sending their children to experimental schools, of which the existence is not legally assured.

Within the curriculum development institute itself there is also a great deal of concern about the continuation of the project and the relevance of the curriculum products. It is becoming increasingly clear that the role of schools in curriculum development has not been sufficiently worked

out in the government regulation. The advisory committees and the curriculum development institute itself pleaded for an order to codify the results of the experiments in an official publication.

In 1981 the Minister for Education issues instructions for the coding of the developments in the experimental process in a coherent document: an experimental curriculum. The specification for this document are, that

- it should be based on the developments in the experimental schools;
- it should provide guidance for those [same] experimental schools;
- it should function as a discussion document about middle school education in a broader circle.

In order to be able to compose this document the project group [almost totally] withdraws from direct support of experimental schools. This will allow them to design an experimental curriculum on the basis of the "grey papers" and the reports made by the schools in the preceeding period. Because the document needs to provide a basis for discussion and guidance, the middle school is mostly described in terms of quality; criteria for the choice and planning of the education offered and the grouping of students are described.

The paper resulting from this is a discussion document of about 600 pages divided into 3 sections:

- in the first chapter the context for the development of the documents is described [history, working methods, general framework];
- in chapter two [25 pages] the general characteristics of middle school education are described and explained;
- in a sizeable third chapter a theoretical analysis of the different possibilities for structuring education is presented. This includes project teaching, team teaching and team-planning; differentiation, and evaluation; and the selection of the contents of education. This chapter does not pretend to be an educational handbook; it simply demonstrates the different kinds of reasoning that can be used by teachers;
- next, ideas are presented for all the subjects concerned [first language education, modern foreign languages, drama, physical education and general technical orientation]. These are ideas with regard to content and didactics;
- the book concludes with chapters on student guidance, school organization, finalizing and continuation.

In all chapters questions are included for user discussion. These are meant, for example, to stimulate discussions in school teams.

We have presented this extensive list of contents to add "flavour" to the document. It is not a curriculum in the traditional sense of the word: it describes a great deal more than just the aims of education in the different subjects areas. It is however also not a handbook for education. The book presents ideas and suggestions for discussion in a systematic way.

As already mentioned, it has largely been written on the basis of the

"grey papers" which had come about in the preceding project period and which reflected the developments in the individual schools. The synthesis of the document was the work of the project group.

The working method can be described as inductive. The varied experiences in the schools form the basis for synthesis and convergence. The Dutch National Institute for Curriculum Development proposed to having a broad discussion on this document before finalizing it and publishing it. The Minister does not agree with this and wants it to be published as soon as possible.

Comment. What does this paper mean for the position of curriculum development with regard to schools? The instructions to prepare this synthesis document are the beginning of a radical change in the innovation strategy. Curriculum developers are withdrawing from direct support to schools. At the same time they have taken up a position between the schools and the government. This new position is certainly not without problems. The schools experience this changed position as "treason" to some extent. It is difficult to accept that the National Institute for Curriculum Development is planning to design a curriculum on the basis of experiences gained in the school. The government could base its regulations [and legislation] on this and this could take away the development freedom of the individual school.

The government itself is not in favour of this position of the National Institute for Curriculum Development - between the schools and legislation. The government wants the Institute to prepare a curriculum document, it does not however want the National Institute for Curriculum Development to become involved in the societal discussion of it.

5 The changed strategy

5.1. Towards a new legislation for junior secondary education

As mentioned earlier: the innovation process was initiated and managed by the Minister for Education. During the period 1974-1982 several cabinet changes took place, these included the appointment of a new Minister for Education, with different political views, also with regard to middle school education. This meant that the process for once would be managed by a Minister who believes in comprehensive education, rather than by one who is opposed to it. In this way the political basis of a long-term innovation process is frequently shifted.

In addition to this, from a quantative point of view, not very big innovation process [15 schools; annual budget of approximately 13 million Dutch guilders, which is about 0,05% of the national budget], which is causing a lot of political and public excitement, a lot of other developments are taking place, as mentioned earlier; innovations on a smaller-

scale but in roughly the same direction, namely:

- prolonging the orientation period for students before having to choose a definite form of education track;
- further internal differentiation also in the final phase of the system [examinations at different "levels"];
- making the contents of education more social [see the description of science education for 12-16 year olds] etc.

Other project groups within the National Institute for Curriculum Development participate in these developments. The most important function of the SLO [see van Bruggen's paper] is to stimulate and coordinate curriculum development. For that purpose project groups were started which develop new curriculum proposals for the different education and subject areas [see Boersma's paper for science education; see Van Bruggen's paper for the functions of curriculum proposals]. Around 1980 the Institute was carrying out the following projects - with regard to **junior secondary education***

- directed writing: a project that was developing a new didactical approach to certain sections of first language education.
- Spanish course: a project aimed at the development of a course in Spanish for day and evening education.
- Russian course: for the longer courses in general secondary education [VWO]**.
- Mathematics 12-16 year olds: a project which can be compared to the project on science education for 12-16 year olds, as described in Kerst Boersma's paper, which works on the innovation and modernisation of Mathematics education. Special attention was paid to working in heterogeneous groups and to finding mathematical contents of importance to all youngsters.
- Science education 12-16 year olds.
- Environmental studies for HAVO-VWO.
- Chemistry for HAVO and MAVO.
- Biology for LBO.
- Social Studies LBO: this project tried to give shape to a new subject area which - next to Geography and History - pays attention to actual societal problems.
- General Technology: this project was designed to bring all youngster into contact with the cultural phenomenom of "Technology". NB in the existing curricula this was only offered at LBO.
- Electro-technology for lower technical schools.
- Music MAVO-LBO: this project was designing a new didactical approach to Music education at MAVO-LBO.
- Development education: this project's aim was to bring themes of development cooperation into education.
- Economics MAVO: this project was designing more up-to-date contents with regards to Economics.

This range of very diverse curriculum development projects shows that the principle on which the National Institute works is effective [see Van Bruggen's paper]. And that although these projects are carried out within a single organization, there is no binding framework within which these content developments can be coordinated. This is largely the result of the big differences in opinion, that exist on the policy with regard to the desired development of secondary education: integrated or comprehensive junior secondary education or an innovation of the contents of education within the existing categorical framework.

In short it can be said that during the period 1975-1982 in the innovation process of the middle school
- the accent of the innovation and the curriculum development there for was on the individual experimental schools;
- the government had taken the initiative and taken up a managerial role, but as fas as content was concerned had little to do with the initiative and management c.q. responsibilities;
- the function of the SLO in the support of curriculum development in this process largely consisted of coding and promoting transfer.

The innovation strategy pursued up to now, has many characteristics of a strategy aimed at social interaction. Cooperation, collaboration and mutual conviction must lead to a political decision with regard to education innovations.

In 1982 the course of the innovation changes dramatically. In the political arena and in public opinion a severe polarization between those in favour and those opposed to the innovation has developed. A policy document is prepared by the Minister for Education -quite unexpectedly- to organize the preparations for a new law on comprehensive junior secondary education. This policy document becomes the subject of negotiatons between the Minister and representatives from the educational field. It is meant to pacify those in favour and those opposed to comprehensive junior secondary education, and in many respects, it is a compromise document between that which experimental schools have brought about and that which, in a polarized climate, is still considered to be realizable.
Some important points of compromise are, that
- the period of integrated or comprehensive junior secondary education will be three years instead of four;
- streaming according to ability will be allowed after two years, which means that there will not be a three year heterogeneous period as the experimental school wanted;
- the period of integrated junior secondary education will be finalized with examinations which will accommodate continuation and allocation in senior secondary schools.

For more than a year a fairly intensive discussion takes place on these proposals between the Minister and the school boards, trade unions and

parent organizations. The intention is to introduce a Bill in parliament on the basis of the results of these discussions.

Comment. What does this mean for curriculum development? This turn of events also had considerable consequences for the institute for curriculum development. The first effect was that the curriculum document in which the results of the experiment were codified was published at roughly the same time as the Minister's policy document. This meant that the curriculum document was out of date within two weeks of its publication. For the buyers of the publication its status and meaning was totally unclear. The document did not link up with the Minister's compromise document, but it was developed and published at his request.

In addition - and in retrospect - it also became clear that the National Institute [SLO] school-related and school-oriented curriculum development together with the lack of direction from the Ministry with regard to content, could only have a very small impact on the policy process. By linking up so closely with the development in the individual experimental schools the institute lost its chance to make an impact on the policy-making bodies, by means of bundling expertise and attainment. In other words: their position between the schools and government leaned too much towards the schools initially. As indicated earlier [see also Van Bruggen's paper], the content of the education offered in schools is only globally determined by the government. The government and the examination committees determine the subjects to be taught, and also the time table for a number of subjects, which are examined centrally. The examination requirements and syllabi which are set up by official committees and which in a broad sense recommend designs and contents, strongly influence the content of education [especially in the upper years].

In the Minister's proposal only very global indications are given of what the education schools have to realize. The Minister is determined to set the goals towards which schools have to strive. The SLO is instructed to prepare a proposal on the content of a program - within the same budget that offered support to the experimental schools - in preparation for the design and drawing up of goals. At the same time the document - again needs to provide information for the schools.

Comment. What does this shift in position mean for curriculum development? In 1982 the position of the curriculum development between experimental school practice and legislation changes considerably. The curriculum development work requested by the Minister - and especially the product: a program design - is primarily meant to serve as a draft Bill. With this work curriculum development gets the task of illustrating the type of education the acceptance of the Bill could lead to. Partly for

this reason the task was tied to a very strict and short - term [about one year].

The strategy for curriculum development therefore changes - abruptly - from being a largely inductive one in the preceding years, to a strongly deductive one: the framework is presented in the Minster's policy document. This paper is not really based on the experiences in the experimental schools and the evaluation of these, but is primarily the result of a compromise. The SLO is asked to design a curriculum proposal within this framework - without further experiments in and with schools within framework.

The acceptance of such a task does present a problem for a national institute for curriculum development, like the SLO. For the SLO a carefully balanced position between the government and the experimental schools is a great importance for the functions of the institute - for its continued existance and for the possibilities to carry out useful work. This insight led to the conclusion that the development of the product requested - which largely came about along deductive lines must be completed with other curriculum products, which are aimed more directly at the support of the developments within schools [see the papers by Van Bruggen and Boersma, with regard to curriculum development on three levels]. As far as the content is concerned it is becoming more apparent that the developments within the experimental schools for integrated junior secondary education and the developments in many other schools [a.o. those involved in other SLO projects] are growing towards each other. In order to break through the polarization in the policy process and also to ascertain an amount of congruity between the outcome of the various projects, it is decided to abolish the separate organization for curriculum development for integrated junior secondary education, on the one hand, and separate subjects, on the other.

The multi-disciplinary project group formed earlier, has been dissolved and the budget available for this reallocated to subject projects which are being carried out by the SLO. These projects, one of which is described in Kerst Th. Boersma's paper, are aimed at the realisation of innovations in the learning areas and - where necessary - giving advise to the government with regard to desirable adjustments in the legislation. Not just the budget, but in principle also the expertise gained in the preceding period laid down in the "grey papers", school reports and the experimental curriculum, are handed over to these project. In this way the double task, supporting schools in their developments by means of curriculum products and making national proposals on the basis of that expertise with regard to the content of the curriculum for integrated or comprehensive junior secondary education, is incorporated in subject projects.

A small group is made responsible for coordination. Coordination in this context means:

- ensuring that an integral curriculum proposal within which all subject areas and their relationships to each other are described, will be produced;
- ensuring that the curriculum proposals for the separate subject areas are coherent and attuned to each other;
- ensuring that useful planning proposals for complementary activities aimed at school specific curriculum examples to go with the integral curriculum are prepared.

Comments. Should the National Institute for Curriculum Development accept the new -unusual - task? The SLO decided to design the integral curriculum proposal within the Minister's framework. As a result of this the SLO runs the risk of becoming part of the discussion around the desired structure of junior secondary education. A societal discussion is still going on around this. For example a heated discussion is going on within Dutch society, at the moment on the question whether a "common core curriculum" is desirable for all youngsters of 12-16 years of age and whether it is essential to have one comprehensive school for this. In the meantime the SLO is working on a curriculum design for such a school on the Minister's instructions.

Whether or not the SLO should have accepted, this task has become the subject of a heated discussion. The arguments against have already been indicated; the arguments in favour are largely based on the consideration that such a curriculum proposal could provide an educational and contentual basis for the arguments in the discussions around integrated junior secondary education. In other words it could demonstrate the type of education, the government's acceptance of the general framework could lead to.

In order to be able to achieve this, acceptance of the framework for the programme to be designed is essential - as a kind of hypotheses. The SLO accepted and carried out the task, with all the risks attached to it.

5.2 Development-working method

The design to be prepared, will be a design of a curriculum for a type of school which does not yet exist. The experimental middle schools carried out experiments with few guidelines from the government with regard to content, in the preceding years. As a result the subject range in those schools deviate from the legal concept in many respects. These schools do however provide a source of experiences which are of importance to the curriculum developers with a view to the design. But other schools, which are experimenting on a more limited scale in separate subject areas and which are bringing about developments, also form a good information source for the curriculum developer.

Not any particular project group is responsible for carrying out this task - as was the case in the preceding phase. The whole of the group involved in the subject project for secondary education is involved in the completion of this task. This must not however interfere too much with the normal process of implementation of the projects.

Comment. Why has this organiszation been set up? This link between the execution of a joint task to design an integral curriculum and the work on separate subject curricula within projects is considered to be essential for success. This integral task forces the design of a longitudinal planning for the subjects and as a result provides the subject projects with a clearer framework for development.

A small, coordinating group within the SLO provides guidelines on the basis of which members of the subject projects are asked to provide their designs of the most important contents within "their" subject area, taking into consideration the framework outlined in the Bill. Relatively little time has been made available for completion of these parts of the design: not more than about two months.

Comments. What kind of problems does this working method give rise to? The preparation of these parts of the design gives rise to different problems in different subject areas. As far as Science Education, Mathematics, Modern Languages [since 1982], and Technical orientation [general] is concerned the staff involved can find support in the subject projects, which have already been running for quite some time, and in which a fair amount of expertise has been acquired. On average 3 to 5 people work on these projects.

This basis is not present in other subject areas. The design therefore has to be made in a more deductive manner and on the basis of a synthesis of very diverse experiences. In the design of this type integral curriculum in addition to difficulties related to the design of a longitudinal planning of the education offered, the different subjects areas are also at different stages of development. The parts of the design are collected by a small editorial group. The resulting design is very overloaded. This is bound to happen because the political content in which this curriculum proposal has to function can also contribute to the legitimation of certain subject areas do not yet have a clear place in traditional education.

An analysis of the products produced by the various subject projects also lead to a new set of more clearly formulated guidelines. An analysis of the document also leads to the conclusion that it is not good for one curriculum document to contribute to the national discussion on the desired content of education, on the one hand, as well as in the meantime also a contribution to the development of education within schools. The

demands made on this type of document are too high. For a national discussion on the content of education, fairly compact descriptions of the main aims are needed; schools are interested in more detailed pedagogical and didactical indications.

A fresh attempt was made in the periode between Autumn of 1984 and Spring 1985. The design for a curriculum proposal that came about as a result in Spring 1985, is still to a large extent, the mental product of members of staff of the SLO, fuelled by experiences in experimental schools, studies of literature, etc. Before offering the design to the Minister, the proposals need closer validation. This validation was of great importance to the SLO particularly because of the position of the curriculum product within the political power game. For the validation three types of question were distinguished:

1. Questions with regard to the usefulness of the document. This concerns answers to questions such as:
   - Have the general aims for extended primary education been translated into the proposals with regard to the content in a responsible way?
   - Is it possible to formulate goals for all pupils on the basis of this type of programme?
   - Does the programme proposal offer a framework for implementation at the school level?

2. Questions with regard to the realization of the design:
   - Are the proposed content teachable and can they be passed on to all pupils in extended primary education?
   - Have important, traditional contents been -unjustly - omitted?
   - Isn't the programme too full?
   - Is there sufficient free space for schools?

3. Questions with regard to the values of the design:
   - Has sufficient attention been paid to all new goals of integrated junior secondary education?
   - Has sufficient attention been paid to the relevant social developments?
   - Which parts of the programme do not form part of the programme for all pupils?

These are - to give some examples - some of the questions from a long list. Three categories of people and groups involved in the consultation have also been distinguished:
1. The "practical experts". These are the people who by means of experience or study have a good knowledge of secondary education and who can assess the proposals from the point of view of practice. This therefore refers to the school teams of the experimental schools.

2. Experts from certain subject areas who are familiar with the developments in their subject area. This includes professional organizations, lecturers at teacher training colleges, inspectors etc.
3. Experts in the field of educational policy and innovation. This includes professional educationists, support institutions, teacher unions etc.
At a great number of meetings and via written comments about 500 reactions on the design were collected. The processing of these reactions and comments has - in a period of about 5 months - led to a new design which has been published and offered to the Minister.

Comment. By Dutch standards this is a big response. The SLO has, in any case interpreted this signal as of great societal interest in the discussion around the content of education in the extended primary education, i.e. the proposed comprehensive junior secondary education.

The place of the SLO as national institute, which only prepares curriculum proposals that cannot be prescribed to the school by the SLO [see Van Bruggen's paper] makes it unclear what meaning should be attached to the results of such a consultation, and how such signals should be processed. By increasing the -social- acceptability, strict processing of these signals - insofar that these are not in opposition - is desirable. The independent and professional position of the SLO on the other hand, at times makes it desirable to reject or ignore certain ideas.

This forms an awkward dilemma for the SLO as a national institute and calls for a careful exploration of where the limits of responsibility lie between the SLO and the government. For the social validation of the curriculum proposals a broad discussion about the design - led by the SLO itself - is important. At the same time the SLO cannot take over the government's task of weighing up the - sometimes opposing interests and claims by society on the content of the education offered.

5.3 Elements with regard to the content of the design

The following principles were used in the curriculum design with regard to content:
1.Integrated or comprehensive junior secondary education is aimed at imparting all pupils in the 12-15/16 age group with the knowledge, insights, skills and attitudes, considered to be essential to them. This means that extended primary education is concerned with the "new basics" but also that these "new basics" need to be re-designed.
2. Integrated or comprehensive junior secondary education offers a continuation of the education started at primary school. This means that education is continued without thresholds, without breaks and without unnecessary and non-functional overlaps.
3. Integrated or comprehensive junior secondary education is "orientation education". This means that education is chosen with the view to pre-

paring youngster for choices they will have to make with regard to further training, and in society.

The following eight goals are formulated in the Minister's policy document which forms the basis of the SLO curriculum design of the SLO.

1. Extended primary education is aimed at continuing general education immediately after primary education.
2. The aim of extended primary education is at least the intellectual and emotional development of all pupils, the development of creativity, the acquisition of knowlegde and basic social, cultural, physical, welfare and technical skills.
3. Extended primary education promotes the social and individual awareness of the pupil, and on the basis of this stimulates social preparedness, emancipation and servitude.
4. Extended primary education prepares pupils for choice of, and participation in, further education, and motivates them to develop themselves further. Also with a view to participation in further education, extended primary education offers pupils insight into the various kinds of further education and in their own possibilities in this respect.
5. Extended primary education is attuned to the continued interest, development level and development rate of each pupil. In this the experience world of the pupils is taken into consideration.
6. Extended primary education's aim is that all pupils will in any case reach a fundamental level in the different parts of the programme. Here the educational aim is that every pupil reaches an optimal level in the various parts of the programme.
7. Extended primary education offers equal development opportunities for boys and girls.
8. Extended primary education takes into account the multicultural character of Dutch society.

Areas	I [Overall table] total = 3.000		II [Schoolyear 1 + 2] total = 2.000	
Dutch	276	567	167	367
Mathematics	267		167	
Science	233		133	
Social Studies	233	767	167	500
English	233		133	
Second foreign language	200		133	
Third foreign language	33/167 *		33/100 *	
Technology	200	367	133	
Welfare	100		100	
New Information Technologie	67		67	
Art Appreciation	200		133	
Physical Education	200		133	
Guidance/carreers orientation	133		67	

* For the choice for 3 modern foreign languages the figures also after the first year are 167, respectively 100.

The division of time shown in this table leaves room for the individual school to emphasize and make choices with regard to contents. For comparison we present the division of time across the various subject areas in primary education and integrated junior secondary education, in the form of a "pie-chart".

Time: allocation for primary education
From: Curriculum Offering for Primary Education in the Netherlands.

Time allocation for the proposed integrated or comprehensive junior secondary education.

N.B. No fixed division has been prescribed by the government for the subject areas in primary education; this is an estimation of practical situations and an average of these. As far as integrated junior secondary education is concerned we are still "only" talking about a proposal by the Minister for Education not about actual practice!

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The objectives for the individual subject areas and the proposed contents are presented in the SLO curriculum design. These should contribute towards the general objectives as formulated in the Minister's policy document.

Comments. In curriculum theory it is known that the step from general policy goals to concrete subject goals is not an unambiguous process. The relationship between both types of goals - as well as their functions - is diffuse. The general policy goals can be seen as "public goals" of which the primary function is to develop slogans which make political consent possible. The subject goals act as a guide for educational planners, teachers, authors of educational books and so on. The relationship between both types of goals is ambiguous.

In the design an attempt has been made to translate the general policy goals into criteria which can be used for debate on the proposals with regard to the concrete education [i.e. the curriculum offering] and to form a legitimizing basis for this. In the design the following criteria have been formulated with regard to the choice of subject matters and goals:

1. they offer the opportunity to gain insight into individual capabilities and needs;
2. they provide an overview of what is covered in the subject area and of what the school has to offer;
3. they provide insight into the consequences of the choices the pupil wants to make;
4. they may not contain a stereo-typed view about boys/girls;
5. they fill the gaps which currently exist in education offered within secondary education with regard to the thinking and experience world and the position of boys and girls;
6. they ensure that everyone can develop technical, spatial, domestic and welfare skills on an equal basis level, for boys and girls, men and women;
7. they pay an equal amount of attention to the interest of boys and girls;
8. they contribute towards the insight the way in which phenomena are studied and knowledge is acquired is determined culturally;
9. they contribute to the acceptance of minority languages and minority cultures and the speakers of these;
10. they contribute to the awareness of prejudices with regard to ethnic groups and an awareness of expressions of racism;
11. they offer support to pupils from ethnic group in the formation of a positive self-image;
12. they are chosen on the grounds of their relevance to social aspects and problems;
13. they allow for a large variety of working methods;
14. in addition to paying attention to intellectual and technical know-

ledge and skills, they offer room for developing qualities in the creative, artistic, expressive, motorial, organizational and social fields;
15. they contribute to a clearer self-concept and a widening of the horizons;
16. they promote different ways of acquiring and processing knowledge;
17. they promote the basis for continuation schooling and for self-development;
18. they promote the basis for being able to function fully in society;
19. they impart essential and fundamental values which are of importance to the continued existence and development of society;
20. they have a great transfer value;
21. they offer room for individual differences in learning and working rate, interest and ability;
22. they promote the introduction of and link-up to pupils' experiences;
23. they integrate general education and vocation-oriented aspects;
24. they allow for several processing possibilities;
25. they are also derived from practical situations;
26. they are equal for all pupils; differences are only permitted at the ability level.

The design - a book in two parts of about 450 pages - presents a framework for a common core curriculum. The curriculum is described in terms of general goals for each subject area and in terms of subject matters [i.e. elements of the subject areas to be offered]: These elements are statements in which subject goals and subject matters of a subject area are brought in relation to each other and with which the general goals are "broken down" into smaller units. The most important criteria for the formulation of content elements were, that

- content elements limit themselves to the indication of core tasks of the subject area; they therefore do not illustrate [or at least only to a small extent] the contribution to general cross-subject goals;
- content elements are in principle not exchangeable, neither within a learning area, nor between subject areas;
- content elements are fundamentally equal; i.e. that one element is not seen as an elaboration or explanation of the other;
- it should be possible to offer content elements to all 12 to 15 year old pupils; i.e. that:
  - in principle it should be possible to offer them [it may be possible to design a related didactic approach; perhaps not from one day to the next; and perhaps not without in-service training; but it is possible in principle];
  - in principle they must be offered.

In chapter 5 of this book we refer to the design for science education. An epiloque chapter deals with the problems related to coherence in the education offered.

Comment. Only when an integral curriculum design is developed, which in addition also uses a single formulating framework for the different subject areas as much as possible, the problems of coherence and overlap in the education offered in different subjects within the Dutch schools, where subject teaching is the dominant system, will become obvious and unavoidable. Kerst Boerma's paper already demonstrated that the existence of such a design reinforces and stimulates the further exploration of possibilities for increasing the coherence and attunement of the education offered in the different subject areas.

The level of specificity at which the education offered is described is a decisive factor in this. If the formulation is too general or global, it provides nothing to hold on to; if the formulation is too datailed and as far as subject matter is concerned has been worked out in too much depth, communication across the limits of the subject areas becomes difficult.

6 Unsolved problems

In the previous chapters we have briefly described the activities and produce of a curriculum development project between school practice and legislation. Some short comments by way of reflections have been included in the text in a number of places. These reflections contain small bits of theory. The aim of this paper is not, to offer a theory on curriculum development and innovation, but to provide a contribution to it on the basis of practical experiences. In our view too many unsolved problems remain to form a good theory.

6.1 Has the Dutch National Institute for Curriculum Development, the SLO, found the right organization for curriculum development work?

The curriculum development work as globally described in this paper, has undergone a number of significant changes in a relatively short periode of time. Too little systematic reflection and evaluation of the different phases has been carried out to form a theory on the basis of this.

- The strongly, inductive working method, which at that time seemed to link up with the overall innovation strategy within which curriculum development had to fit, was changed to a strongly deductive working method within a very short period of time.
- A switch-over took place from a strongly project isolating strategy, in which relatively few experimental schools participated, to a matrix strategy in which a large number of separate projects had to work within an integral framework. At the same time the school fields involv-

ed became more diffuse and less unambiguously defined.
- From a project organization for curriculum development [seen from within the institute's organization] a switch over to matrix organization took place].

The latter meant that staff were taken away from their ''normal'' project tasks for a short period of time and for part of their working week, so that they could work on the integral curriculum. This type of working method is only possible - it seems to us - within an institute where an extensive range of curriculum projects is carried out. From this cooperation with regard to an integral and coherent product coordinating impulses are sent to the individual projects. At the same time this change from project organization to matrix organization is an internal innovation process for the institute, which should not be underestimated. The attunement and management problems in this type of organization increase exponentially, because there is a constant tension between the different tasks on which the staff are working.

One of the assumptions that form the basis of the matrix organization, is that the work at the different levels of curriculum development [namely on an integral curriculum and on subject curricula] can be better coordinated in this way, and therefore leads to a higher degree of attunement. As mentioned earlier the first signals about the correctness of this hypotheses can already be seen. Little can be said however about the effects on the work in the long run.

6.2 What is the result of ten years of curriculum development in a national innovation project, and why aren't these results bigger?

No doubt, all the work that has been done by the schools and by the curriculum developers has been useful. Changes have taken place within individual schools: more attention for student guidance, a stronger accent on the social meaning of the contents of education, more attention for delaying the moment at which a definite choice for further education and career has to be made by pupils. The role of curriculum development products in these changes is difficult to determine. It is even difficult to find out what impact curriculum development - as the activity of people and as a product - has on policy making. There is - as far as we are concerned - an unresolved tension between the need for long-term planning for effective curriculum development [see also Van Bruggen's paper] and the political and policy changes. This tension cannot be ignored by curriculum development of national importance. It asks for a flexible adaption of the SLO to political and policy changes. This type of tension can only be managed if the national institute self-confident, and has opportunities for keeping sufficient autonomy with a view to the schools and with a view to the government which subsidises it. The autonomy must enable to institute to combine long term planning on professional

grounds with questions from the schools and the government which are aimed at a quick result.

6.3 Curriculum development and the Constitution

A special problem - also in relation to assessing the impact of SLO activities in this type of situation - is the freedom of educational direction which characterizes the Dutch education system. This means that - as indicated earlier - the government only lays down the content of education in schools in global terms. This can therefore lead to a big discrepancy between the way in which the education offered is described by the government, and the way in which it is organized and structured in the schools. In a curriculum document developed on government's instructions, the structure of the government regulation is followed. For this reason the described and discussed SLO curriculum design for the proposed comprehensive secondary education is, for example, divided into ten subject areas.

It is quite possible that schools organize the education offered in a different way, for example in five subject areas. Schools then describe this education offered in so-called school specific curriculum [in Dutch: schoolwerkplan].

It is therefore difficult to find out what the impact of a national document with a different structure is. In order to increase the possibility of impact, the development of school specific curriculum as examples for schools is of great importance.

6.4 How does a national curriculum development institute cope with the uncertainy of unclear policy framework?

It is not without risk for a national curriculum institute to work on a curriculum proposal within a legal framework that has not yet been laid down. During the work on the described curriculum proposal the fact that in the national discussion - outside the SLO - the question of whether the laying down of goals for all pupils is desirable, was still going strong, while the SLO was developing a programme proposal to prepare these goals, played a mayor role. In doing this the SLO ran the risk of becoming involved in the discussion of the desirability of goals which set norms for the schools. This discussion can however not be settled on curriculum arguments. A determining factor in this is the societal view on the function of extended primary education.

The refusal of this type of task does not provide a solution however. Setting aside the budgetary problems which this would bring about, this would mean that the government would instruct another - and probably less professional and less independent - organization to carry out this

task. The tension can only be managed by working in an open and controllable way, by not avoiding the discussion and where necessary by formulating alternative solutions for problems.

6.5 How can curriculum development function within a two track policy?

It is not easy to get project-members to contribute to a polarized policy. The differences in opinion with regard to the policy to be pursued by the government become evident within the professional organization. And where the curriculum development work within the context of this outlined paper is not purely a technical-professional activity, but where it is strongly tied to the ideas about the content of the goal of education and the place of this in society, different ideas cannot be organized away.

6.6 How do you get curriculum products in innovation and implementation to function within a professionally segregated educational support system?

In the papers by Van Bruggen and Boersma a sharp demarkation of the taks of the Dutch National Institute for Curriculum Development, i.e. the SLO, and other innovation institutes is indicated. This situation results in the SLO getting very little feedback on the usefulness of its products; it does get feedback from the schools participating in projects. but gets hardly any feedback from the wider circle of buyers of the publication. In the paper by Eddy Jozefzoon more data is supplied on this theme. By means of the consultation procedures which have become part of the normal routine, feedback is provided by the expert-circle surrounding the SLO, but not [enough] is provided by the intended user-field.

The dillemma here is that in a polarized policy situation a common policy in cooperation with the other innovating bodies is hardly possible, because of the lack of [sufficient] agreement with regard to objectives. When such a common policy is lacking then the carrying out of curriculum development from within a national institute - judging by its contribution towards a national innovation - is almost impossible.

The paper by Boersma shows how a project for "Junior Science Education" is developed within the managerial and political context described in Van Bruggen's and Labordus' papers. For the development of the project, questions with regard to the content and didactical choices and questions with regard to which products should be developed and which procedures and strategies should be employed are of importance.

After the project is completed and implemented, the development strategy for the project is described. Characteristc of the development strategy is that both inductive and deductive elements can be distin-

guished. The integral curriculum design for science plays an important role in the development of the project. At this moment the design of the project is carried out via a largely deductive procedure up to the level where themes can be segregated.

Thematic units have an important place in the project, because on the hand of this, the chosen points of reference with regard to the content and didactics, can be worked out in more detail. Important points of reference with regard to the content and didactics are the choice of one subject "Science" and choices with regard to the selection of contents on the basis of their relevance within the contexts relevant for the pupils. A large number of problems arose from this last choice, for which no immediate solutions were available. With the necessary information a picture is presented of how an attempt was made to find workable solutions for these problems.

APPENDIX 1: Some figures concerning secondary education.

To give an impression of the expensiveness of Dutch Secondary Education we provide some information here [figures from 1981].

Number of schools:

for junior vocational training :	1.302
for general education :	1.503
Total	2.805

Number of pupils:

in junior vocational schools :	405.102
in general secondary education : [lower stage]	602.566
Total	1.007.668

Number of teachers working in secondary education: 81.142

Public expenditure:

Total of education	26.892,4	million Dutch guilders	
of which	9.040,9	for secondary education	
which meants to	6.870	Dutch guilders per pupil	
Pre service training		211,1	million Dutch guilders
In service traning		29,7	" " "
Schools support		98,8	" " "
Curriculum development		22,8	" " "
Test-development		17,3	" " "
Educational research		20,4	" " "
Developing projects secondary education		19,3	" " "

APPENDIX 2: List of SLO discipline oriented projects in 1985*

Project file		Project title
3458	-	Fries in het voortgezet onderwijs
3472	-	Taalvaardigheidsdoelstellingen vreemde talen onderwijs
3529	-	Moderne vreemde talen onderwijs 12-16-jarigen
3381	-	Wiskunde 12-16-jarigen
3481	-	Informatica 12-16-jarigen
3426	-	Natuuronderwijs 12-16-jarigen
3377	-	Maatschappijleer MAVO/LBO
3405	-	Geschiedenis en aardrijkskunde
3411	-	Godsdienstonderwijs
3424	-	Humanistisch vormingsonderwijs
3485	-	Mens- en maatschappijonderwijs
3486	-	Economie HAVO/VWO
3317	-	LTS-electrotechiek
3478	-	Alternatieve energie LBO
3488	-	Informatica technisch beroepsonderwijs
3369	-	Muziek MAVO/LBO
3508	-	Expressie en lichamelijke opvoeding 12-16-jarigen
3585	-	Leerplanontwikkeling voor etnische groepen, intercultureel onderwijs en onderwijstimulering
3553	-	Nascholing engels in het voortgezet onderwijs
3375	-	Algemene technieken
3456	-	Educatief project ontwikkelingssamenwerking
3446	-	Mechanische techniek LTO
3493	-	Bouwtechniek LTO
3237	-	Gezondheidskunde LBO
3536	-	Informatica LEAO

* For the project goals see chapter 9 of this book.

Kerst Th. Boersma

4. The innovation of Junior Secondary Science Education in The Netherlands

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6. Unsolved problems

1. Introduction

In the past few years it has been increasingly felt that education is losing its social relevance, that the large innovative projects of the '60's have had very little impact on re-shaping education, and that the education currently offered to students is insufficient to prepare them for life in tomorrow's society (e.g. Gardner, 1983; National Science Board, 1983).

As far as science education is concerned some studies suggest that large-scale projects in the US and UK (e.g. BSCS and Nuffield) have not made as extensive a contribution as was expected and that the instruction offered is no longer relevant to the demands made by today's society (e.g. Welch, 1979; Yager, 1982; Goodlad, 1983). By contrast other studies report that the new science curricula "exceed the performance of 63% of the students in traditional science courses" (Shymansky, Kyle and Alport, 1983). Yet other studies show that in the Nuffield Project there appears to be a fundamental 'mismatch' between what students are capable of and what is offered to them (Shayer and Adey, 1981).

Attempts have been made to find solution to the problems stated above for science education along two directions:

1. Increasing the social relevance of the education offered by focussing the instruction on social applications and problems, thus leading, among other things, to the development of unified science-technology-society education.
2. Matching instruction to the cognitive structure of the students and doing this in particular by improving teaching strategies and reducing the number of abstract concepts taught. At the moment there are enough experimental studies available on students' preconceptions but relatively few studies on the way in which the learning process is structured and the consequences this has for structuring teaching materials.

The educational trends indicated above are recognizable in the Netherlands as well. In the Netherlands too, the discussion on the quality of education has, in the last few years, narrowed in focus. In the Middle school experiments already reported on by Labordus, experiments were made at integrating science education in which increasing attention was paid to social relevance. The same is true for professionally oriented science education where, gradually, more emphasis is being laid on linking science content to aspects of the students' every-day world. Concerning this point important work has been done in the Netherlands by the Project Leerpakketontwikkeling Natuurkunde (Curriculum Development in Physics) (Eijkelhof et al., 1986). In the last few years researchers and material development specialists have particularly paid a great deal of attention to concept development.

The development in science education in the Netherlands indicate that fundamental innovation in content and didactics is considered desirable by many people. At the same time, because of repeated postponement in political decision making regarding the structue of second-

ary school education, there is considerable uncertainty about the sort of framework within which the desired changes should occur*.

As a result of the lack of clarity about frameworks, it is necessary that projects undertaken by SLO on seconday education must, in many cases, be directed towards both the existing system of education and the proposed "Voortgezet Basisonderwijs", i.e. the Comprehensive Junior Secondary Education (See Van Bruggen's paper).

This paper explains how, within the context of the current uncertainty, the Junior Secondary Science Education project was developed. The questions the project focussed on are the following:

1. What content and didactic choices must be made for a Junior Secondary Science Education project if it is to make a satisfactory contribution to innovation in science education.
2. What products (teaching materials and publications) must be developed and what accompanying procedures and strategies worked out, keeping in mind the fact that the project must cater to both the current education system and the proposed comprehensive junior secondary education?

With reference to **Question 1**, the most important choices made for the project were the following:

- the choice for one unified subject: Natural Science;
- the choice to select content based on contexts relevant to the student.

The choices made with reference to **Question 2** are inherent to the choices the SLO makes from a context of opposing choices: "what is educationally desirable?", "what is politically feasible?" and "what emerges as every day reality in the field?"**.

Essential points of SLO policy for setting up a Junior Secondary Science project are:

- the project should be concerned with the three levels of curriculum development;
- the project must conform with the so-called "2-sporenbeleid" (a 2-track policy), i.e. it should be directed towards both the current secondary education system and the proposed integrated or comprehensive junior secondary education, henceforth abbreviated as VBaO.

The choices made in connection with Question 1 will be elaborated in Sec. 4 en 5; Sec. 4 will be concerned with details at micro-level, and Sec. 5 at macro-level. Choices for Question 2 will be elaborated in Sec. 3. To begin with, however, the following section (Sec. 2) will describe in greater detail how this project for Junior Secondary Science Education entitled "Natuuronderwijs voor 12-16 jarigen" (Nature Study for 12-16 year olds, henceforth abbreviated as NO 12-16) came into existence. Brief details of the genesis and points of reference of the project will follow.

* Labordus has dealt with this in detail in his paper. See therefore chapter 3 in this book.
** See Van Bruggen's paper for an elaboration of this in chapter 2 in this book.

2. The Project "Science Education for 12-16 year olds"

2.1. The project team

The project is currently run by a team of eleven people. None of the team works for more than 60% of their time on the project. Most members have expertise in curriculum development acquired through experience on other innovative projects on chemistry and physics where the SLO was involved. There is very little integrated natural science being taught in the Netherlands at the moment; consequently, there is no expertise in curriculum development in this area. Such expertise will, to a great extent, have to be developed. In putting together the team, care was taken to see that apart from team members permanently employed by the SLO -especially chemists- people from other, hitherto unrepresented, disciplines were also included, either on a part-time or on a temporary basis. A few of them also work in a teacher training institute. The project team consists of chemists, physicists, a biologist, a physical geographer, an agriculturist (financed by the Ministry of Agriculture and Fisheries), an educationist, and a staffmember from the National Institute for Educational Measurement. The project leader is Rob de Kievit. The project team is assisted by an advisory committee which is especially concerned with policy regarding the progress of the project.

2.2. The Genesis of the Project

Much of the choice with respect to selection of content and didactics was made well in advance of the start of the project in August '83. The points of reference in broad outline were laid down in the projectplan (Dec. '82) and it was on the basis of these that the SLO approved the project. Before discussing the points of reference of the project we will describe the history behind the project to illustrate the way the project - in conformation with SLO policy - satisfies certain specific condition. These are:

- that there be a good fit between the project and questions arising in the field,;
- that it be linked to changes in the Dutch education system, and
- that it be in step with international developments in the area of science education.

Since the 1970's, in Holland as elsewhere, there has been increasing criticism of traditional science education. When the conference of the International Council for Associations for Science Education was held in the Netherlands in 1978, many people realised that in many other countries integrated science education had already been or was being developed. In all probability, this conference was a turning point for many people here. Two schools in 1981 asked the SLO to support their integrated

science education program and NVON (the Dutch Association for Science Teachers Education) submitted a proposal for a project ''Kennis der Natuur'' (Introduction to Natural Science) for junior secondary vocational education.

The SLO itself took on various activities connected with integrated science teaching. In 1979 a group, mainly SLO-staff, visited projects run by the Federation for Unified Science Education (FUSE) in the USA. Analysis of the experience gathered there was claerly seen as a sort of preparation for further development in Nature Study for secondary education (Hoogeveen et al., 1981). Based on the foregoing experience, in Spring '81 the Science department of the SLO prepared a plan for research on a project for Natural Science for 12-16 year old. In October 1981 the Board of the SLO approved of a related pre-investigation under the condition that the pre-investigation would result in a report and in a project plan.

The pre-investigation was concerned with an analysis of emerging trends in Dutch science education and an analysis of integrated science education projects abroad e.g. Nuffield, SCISP and ASEP. The resulting report not only outlined developments in the Netherlands and abroad but also provided a discussion of possibilities and reasons for change. In fact the didactic points of reference for the later project were formulated in this report.

It was established that the application and effects of science in the life of the individual and in society deserve more attention than is hitherto the case and this can be ensured best, not by the structure of the discipline but, rather by context serving as the organising principle. By ''context'' is meant aspects of daily life and society. It was also established that in place of several different science subjects, one school subject - Natural Science - was desirable.

The report on the pre-investigation and the project plan (Project group NO 12-16, 1982) were discussed at a specially organised conference in 1982 (Hoekman and De Kievit, 1982).

On the basis of the project plan, members of the later project group, management, advisory committees and the board of the SLO held many, and frequently heated, discussions about the development strategy to be followed and the planning and characterisation of publications. Members of the project group stressed, above all, their desire to work in a ''school-centred'' fashion; others stressed the importance of having, as quickly as possible, a first draft of a curriculum (See sec. 3.1 for a discussion). In April 1983 definitive decisions were made with the result that, in 1983, a plan of execution was submitted for the academic year 1983/1984, and the project commenced in August 1983. It was decided that project NO 12-16 should on the one hand cater to the needs of the NVON and the two schools mentioned earlier, and on the other hand should concentrate on the development of Natural Science for the proposed VBaO; it was also decided to adopt a 2-track policy. In addition it was decided that the project group should publish quickly not only a few sample of themes

but also a first publications at macro level along with a first draft curriculum.

2.3. Points of reference

In the project plan set up in the preparatory phase certain points of reference were formulated. The following two reference points relate to Question 1 concerning choice of content and didactics (See Introduction).

1. The project is set up from the perspective of one school subject Natural Science, the content for which shall be based on context (See 4.1 and 5. Sec. 3.4 discusses the way this is worked out at the different levels of curriculum development).
2. The project shall cover the entire breadth of secondary education; materials will be developed for heterogeneous groups and their teachers (Sec. 4.2. gives details of how this was done by means of "the development of thematic units).

The following three points of reference relate to the development of strategies, etc. referred to in Question 2.

3. Work shall be done in close cooperation with teachers; this collaboration must result in publications which are usable within the classroom (See Sec. 3).
4. The scope of the project shall be broad enough so that development, schooling, in-service training/refresher courses, dissemination and research will be carried out as far as is possible with an underlying unity. The project group shall not carry out all these tasks itself but shall set up collaboration with appropriate institutions whenever necessary (Sec. 3.5 discusses this in brief).
5. The project shall work in as "open" a manner as possible; information shall be made available to everyone (See Sec.5).

These points of reference were set up with a view to the future, after the project has ended, to enhance the chances of successful implementation. The points of reference keep in mind above all the special place occupied by the SLO within the Dutch educational support system (see Van Bruggen's paper).

The first plan of execution for 1983/1984 included decisions arrived at during discussions on the project plan. The plan of execution also listed those publications that would have to be ready within that plan period - a "sketch" for Natural Science; a publication at macro level i.e., a national framework; and a few sample thematic units. For this a development strategy was chosen which covered both the macro- as well as the micro-level. The following section discusses the development strategy of the project.

3. Development strategy

In Sec. 2.2 it was stated that when the project began there were differences in approach regarding the development strategy to be followed. Sec. 3.1 will go deeper into the different points of view because these were of great importance especially for the first phase in the development of the project. Then the development phases will be described and commented on (Sec. 3.2 and 3.3). In Sec. 3.4 the development of the themes will be gone into in greater detail. Sec. 3.5 rounds off the section with details of network building.

3.1. Choice of development strategy

The Project plan (NO 12-16, 1982) was initiated by the then project group. It stated among other things what publications would be worked out. In the first instance this was to be model lesson material comprising student material, teacher material and testing material. On the joint basis of this concrete teaching and learning material and the classroom experience with it, certain important problems such as differentiation and "context directedness" would be worked out in greater detail. Based on this experience and on the publications, it would then be possible to work on suggestions for a natural science curriculum for the first three years of secondary education.

The project group and the former coordinator of the section chose to use, to a great measure, an inductive approach for the development of the curriculum. Around this times it was becoming clear from the experience with Chemistry and Physics projects in the Netherlands and projects abroad e.g. the ASEP-project, that an inductive method of curriculum development did not necessarily lead to success. The members of the managing board of the SLO in particular were strongly opposed to the development strategy proposed by the group.

The following arguments were put forward:

- Making examples too long does not lead to clarification of keyproblems concerning curricula viz. choice of content and goals, and choice of sequencing.
- When topics which are not included in the (draft) curriculum are developed, they are likely to become too school-specific.
- If a (draft) curriculum is not developed fast enough, the connection with other projects (technical orientation, social studies, mathematics) remains vaque.
- A draft (curriculum) is essential to general policy discussions on secondary education.

The project group, however, felt that if the above arguments were accepted, there would not be enough "school centredness" to the work. In the group's view, however, the following points were uppermost:

a. The team members had built up experience in development projects which directed themselves largely, if not entirely, or which had using an inductive method successfully modified/developed a curriculum. They did not feel that Project NO 12-16 was so different in context from other projects that the same strategy could not be used for Natural Science.
b. The project group was initially quite impressed by the Australian Science Education Project in which topics were to a large extent, interchangeable; the initial choice was, therefore, for a modular structure in which there would naturally be less stress laid on the sequencing problems at curriculum level.
c. The group was also initially unconvinced of the need to cater to both the current education system and the proposed VBaO; after all, there were as yet no schools!

Under pressure because of the decisions made by the Board, the project group composed a note which stated that work would be done simultaneously on the development of thematic units and on a "Sketch for Natural Science". In the Sketch attention would be paid to the philosophy of education, goals, description of content, communal and differential education offering, and differentiation and its relationship with the current education system.

The functions attributed to the Sketch were based on the arguments raised by the board. One more function was added - the Sketch was to function as a content framework for the development of model thematic units, proposals for school-specific curriculum, and research questions. How far the functions ascribed to the Sketch were met by the draft for the Sketch (and later by the first version of the Sketch) is discussed in the following section.

3.2. Phases in the development of the project

Now that the project is halfway towards completion, a description can be given of the development strategy followed to date; it is also possible to take a reasonable guess as to how the development strategy will run its course to the end of the project. We will now discuss with regard to the questions posed in Sec. 1 (pertaining to strategies and products) the choices that have been made to date.

In the development of the project (August '83 to August '88), three phases can be distinguished. The **first phase**, from August 1983 to May 1985, is a consequence of the elaboration of the plan of execution 1983/1984 and the plan of execution 1984/1986 (NO 12-16, 1984), which appeared shortly after the project began.

A draft version of the "Sketch for Natural Science" was published for a "resonansconferentie" (i.e., a conference intended solely to get feedback) in May, 1984. On the basis of the feedback obtained this draft ver-

sion was converted to a "Sketch for Natural Science" (first version) (De Kievit and Brouwers, 1985). The draft contains the points of reference formulated for Natural Science, a "body of knowledge" statement for science, and a first definition of cognitive, skills and attitude objectives for five context areas.

At the same time, together with teachers from experimental schools i.e., those schools which took part in the project, five model thematic units were worked out: "My Clothes" (Hondebrink, 1984); "Pets" (Ettekoven, 1985) "Your home, a comfortable shelter" (Gravenberch, 1985); "Soil and Environment" (Borghart and Goedvolk, 1985) and "Milk" (Abeln and Hondebrink, 1985) (See Sec. 3.1 and 3.4).

The first versions of the first two units were discussed at the "resonansconferentie" mentioned above. In the same period a description of Natural Science at a few avo/vwo* schools was published (Davids and Hoekman, 1985) and a start was made on some studies on areas of importance to the further development of the project namely heterogeneity and the connection between elementary education and secondary education.

In these studies project experience and a study of the literature was brought together and worked out in the form of booklets that could be readily used by teachers. The studies provided fresh impetus for expanding the Sketch and application and further for working out of new units. At the end of the first development phase it was felt that the Sketch, in the form it then had, did not provide sufficient guidelines for choice of topics nor for selection of content within topics. Also, insufficient attention had been paid to seeing that the project fell in line with other SLO projects. The units developed did not fit into the framework drawn up in advance and here the concern of the Board was justified. The units developed could only be used within the programs of the experimental schools or in those schools which were prepared to make time within their own programs. The project team recognised these problems at the beginning of 1985 and took the initiative of working out a draft curriculum. This development occured very rapidly because the group was obliged to assist in the development of an Integral Curriculum Design for the incipient VBaO i.e. the by the Ministry for Education and Science proposed new integrated or comprehensive junior secondary education.

The second phase in the development of the project (from May 1985 to August 1986) began at the time that the draft of the so-called Integral Curriculum Design for VBaO was made available: a definition of minimum content and feasible and desirable characteristics developed on the request of the Minister for Education and Science and, intended to give a solid basis on the decision making by the Dutch Parliament (Labordus and

* See for these abbreviations chapter seven in this book.

Gussenhoven, 1985). Labordus' paper describes in detail the setting up, and the content of this Design.

This Integral Curriculum Design is of importance to the further development of the project for two reasons:

1. Considering that the project is also aimed at developing Natural Science for the VBaO it offers in fact a framework within which Natural Science should be developed for the VBaO system.
2. The Design, also called in Dutch 'Inhoudselementenontwerp'* makes a statement on the minimum education contents to be offered; that is to say, it delimits the parameters within which a program can be developed.

Sec. 4.5 contains a discussion of the content of this Integral Curriculum Design of the way in which it came into existence and was worked out. The plan appears at the end of this paper. Working out the curriculum design will make an important contribution to filling out the "Sketch" and will form part of the second version of the "Sketch" (in 1986).

In the second phase of the project the manner of developing themes was modified not only because the Integral Curriculum Design could be used to shape content but also because it was decided to develop new topics on the basis of a profile sketch and to work out other themes only partially. In addition in the second development phase, themes from the first phase were further developed, studies begun earlier were continued and fresh studies begun on environmental education and fieldwork.

The third phase in the development of the project extends from August 1986 to the end of the project period, August 1988. During this phase the number of experimental schools will be increased in order to develop school board curricula for second and third year Natural Science. School-board curricula for the first generation experimental schools will be finalized.

Simultaneously, based on the experience gathered in the experimental schools, suggestions for variations in het curriculum will be worked out coupled with suggestions for behavioral objectives. At this time it cannot be stated to what extent themes already being developed will be worked out. Nor can it be said what fresh themes will be worked out. Naturally, the studies being worked on will appear as publications. The project will be rounded off with the publication of the third version of the "sketch", which will contain a summarised account of the experiences and achievements of the project.

The developments mentioned above are characterised by deductive and inductive parts. This becomes clearly apparent when the development strategy makes a distinction between developing the didactics of NO and developing a curriculum for NO.

The didactic points of reference for the project were formulated at a

* It contains definitions of goals of the major curriculum areas to be offered in the new comprehensive junior secondary education (VBaO).

very early stage of the sketch. These points of reference were then concretised into themes. It goes without saying that working out the didactics is jointly based on the literature and closely linked to the handling of ideas and concepts which are relevant to the chosen points of reference or to similar ones. The experience resulting from this will be recorded in the second version of the "sketch" to allow others besides the project team and the teachers involved to acquaint themselves with what the project has been able to achieve. In the last phase of the project, the experience gained from the second version of the "sketch" will be summarised in the final version of the "sketch". There is then with respect to didactics a succession of deductive, inductive, deductive and inductive parts established.

In the first version of the "sketch" there is as yet no draft curriculum for Natural Science. A broad outline of "the body of knowledge" is sketched out and a picture given of ways to work it out. A first move in the direction of a "core curriculum" for nature study was made with the development of the design for a Integral Curriculum for the proposal comprehensive junior secondary education where a first step was taken towards an integrated approach. At present the project can be carried out in such a way that the draft school specific curriculum can be tried out in the experimental schools. This will ultimately result in a description of NO as it is actually carried out in schools. Based on an analysis of school specific curriculum, it will be possible to make tentative suggestions to formulate curricula for Natural Science. Thus we can distinguish in the development of the curriculum both an inductive as well as a deductive part.

3.3. Evaluative comments on the development of the project

At this moment we can say that the development of a design for an Integral Curriculum for the proposed comprehensive junior secondary education was truly necessary to develop a draft school specific curricula to select topics which fitted into a total program. On the other hand, it is equally clear that the development of a curriculum document like the above mentioned Integral Curriculum does not lead to a realistic curriculum unless it has a large enough empirical base. An empirical base to the project is however quite difficult to set up because the government does not create a situation whereby schools which would like to opt for the proposed comprehensive junior secondary education (VBaO) can develop in this direction. None of the schools linked to the project can, even if they wanted to, try out a complete draft of the Integral Curriculum because they are bound by the existing curricula and the associated examination rules. Empirical testing of the project, which would normally allow for modification and changes, etc. now only exists in the form of

experiences collected from trying out different parts of the total project in a number of schools.

We hope that towards the end of the project (August '88) details of curricula, of which but a small part will have been empirically tested, can be presented. These curricula will be for both the current system and the VBaO.

Even detailed advice and consultation can only partially set right this problem. If the bill concerning the new structure of secondary education survives the debate in parliament, then the chance is great that objectives worked out for the project will be laid down as ministerial policy. Schools will then be required to direct their teaching in such a way that these objectives are realised.

The above makes it clear that the question - what products must be developed and what strategies adopted - has to be answered as follows: Products (i.e. publications and materials) must be developed at three levels of curriculum development; in doing so both deductive and inductive strategies must be adopted. These strategies however do not lead to an end product with a satisfactory empirical base. To have such a base, support from the government is necessary by way of policy.

The conclusion that both inductive and deductive strategies are required to develop project NO 12-16 indicates that the decision taken by the SLO board to publish quickly a first draft of the curriculum for Natural Science was the right one.

Thus the fact that the "sketch" does not completely serve the function of a draft curriculum can easily be construed as reproachable. It could be said that is cost the project almost two years' delay. On the other hand it could equally be said that the decisions of the board might have been correct but might also have been somewhat unrealistic. Some of the problems related to this will be discussed below.

1. It has already been stated in 3.1 that the experience the project team had with curriculum development was limited to the systematic development of teaching and learning materials and to the modification of existing curricula. When the project began in 1983 none of the project team had experience with the structuring of a completely new curriculum, nor did they have experience with curriculum development involving three levels which had to be simultaneously developed.

2. The project team realised in 1983 that neither an inductive nor a purely deductive development strategy would result in a realistic curriculum. The development of another large project in the Science Department, "Natuuronderwijs voor de Basisschool" (Natural Science for elementary schools) had not yet reached the stage where it would become clear that for this project too inductive development strategies would lead to curriculum proposals only with a great deal of difficulty. One point that played a strong role here was the idea of throwing the choice for inductive or

deductive strategy back to knowledge theory paradigms. Despite the refutation by several philosophers and those in the field of knowledge theory, the belief in the inductive method is firmly rooted (Hodson, 1985). Inductivist views are in many cases strongly developed especially among those academics who attach a great deal of importance to experimental methods. These views also surfaced among the project team.

3. The discussions on the development strategy for the project took place in the period January - April 1983. Management and Board, very probably, thought all too easily that the project could make a fundamental turn about in a relatively short time. The literature shows that such a fundamental change of views - a paradigm change - often requires several years (see, for example, Gruber, 1973).

4. A second point underestimated by policymakers concerning development strategy is the strongly innovative nature of the project. There is a great difference between setting down that content shall be selected on the basis of its usability within contexts, and actually working it out. The project group needed about a year and a half to set out the ways in which the concept "context" could be understood and worked out. Only now, in the second version of the sketch, the project group has reached the stage where precise statements can be made about the concept "context" (see sec. 4.1). Similar problems can be expected if the consistent cry "Link up with the student's experiences" is to be handled. The question is not only "how do we do it?" but also "can we do it at all?"

5. If we weighed up the above evaluative comments, we could conclude that the current manner of developing the project shows a good balance between what is desirable and what is feasible. Problem areas have been identified in time, with the result that strategies have been duly modified.

6. The phasing desceribed in sec. 3.2 (with the inductive and deductive parts relevant to the development of didactics and the curriculum) seems for the moment an appropriate strategy for developing those projects which satisfy the following criteria:

- projects in which curriculum development takes place at the micro-, meso- and, macro-level;
- projects in which adapting existing curricula turns out to be insufficient; or where there is too large a gap between the existing curriculum and what is considered desirable; or where no curriculum exists;
- projects in which not only content but also significant didactic innovation is introduced.

In sec. 5 a fourth phase of curriculum development is introduced. This phase is concerned with increasing the chances of succesful implementation.

3.4. The development of themes

The themes that have been developed have two functions:

1. They provide schools the opportunity to develop relatively well thought out and tested teaching material; in this way schools can contribute to the development of their own natural science programs.
2. They provide an opportunity to the project group to concretise didactic choices within teaching materials thus anabling the project group to get a better picture of what is feasible for the ordinary teacher within the context of Natural Science.

The themes, as they have been developed to date, are examples of teaching and learning materials in the sense of models for natural science as it could be worked out. There are two reasons for this. In the first instance, the SLO is not permitted to develop complete curricula (Van Bruggen discusses the reasons for this in his paper*). And in the second place, the themes were developed before the first draft of the curriculum was available so that it was not clear, in advance, if they would even fit into the as yet undeveloped curriculum. The themes naturally fitted into the natural science programs of the experimental schools, schools which till today are bound only by a global description of the subject "Introduction to Natural Science" and a final examination program for "Introduction to Natural Sciences for lbo"**, Geography, Biology, Chemistry and Physics for lbo** and avo/vwo**. At present, the purpose in developing the themes has shifted from providing examples for Natural Science to themes developed on the basis of previously sketched profiles. These profiles not only indicate content but also formulate didactic questions which should be worked out. In the profile sketch for one of the new themes, "The Weather Report" (for class 2), the following didactic aspects have been formulated

- development of fieldwork which will be carried out by groups of students in their own surroundings;
- focussing strongly on the pre-conceptions students have about weather;
- working out differentiation with respect to difficulty levels for the optional parts.

It was also decided that from now on themes could be worked out only partially.

A semi-worked out theme consists of texts (not complete) for students and guidelines for teachers, leaving teachers free to work out a theme as they see best. Fully worked out themes on the other hand consist of a complete student text and instructions for teachers. Themes are developed within a team. Each team consists of two projectworkers from the SLO and natural science teachers from two or three of the

* See for the paper of Van Bruggen chapter 2 in this book.
** See chapter 7.

associated schools. The contribution made by the teachers to the development of themes varies from school to school and from theme to theme. For some of the themes, teachers were restricted to commenting on previously submitted proposals of draft texts (This was the case with the unit on ''My Clothes''); whereas in other cases their contribution was much greater. In fact, the final version of the theme on ''Pets'' was written by a teacher from one of the experimental schools. Three versions of each theme were worked out and only the second and third versions were given to those not directly connected with the project. The formative evaluation research undertaken by CITO, the Dutch National Institute for the Educational Measurement, played a very important part in constructing the second and third versions.

3.5. The building up of a network

Certain factors made it necessary for Project NO 12-16 to establish a network of specialists (from areas such as research, implementation, curriculum development, testing, in-service training and well-qualified and good practicing teachers) who could be called upon when required. A primary factor is the limitations in the charter of the SLO. The SLO can develop curricula and provide advice on these but it may not carry out research, implement courses, etc., develop tests, run refresher courses or systematically develop teaching and learning material. This implies that:
a. whenever curriculum development has to be supported by research, arrangements have to be made for the research to be carried out or the knowledge of researchers (qua literature study) has to be drawn upon;
b. contact has to be established and maintained quite early on with those concerned with in - service training/refresher courses and with teacher trainers working in the area of NO to ensure succesful implementation of the courses of instruction developed. This must also be done at a later stage with publishers of educational materials to advise them about which courses of instruction need to be developed.

A second factor is that the SLO works in as open a manner as possible which means that the project group maintains contacts with special interest groups such as associations for teachers and professional societies.

A third factor is that it is considered desirable that the internal expertise in curriculum development be supported by outside experts and by others such as ''praktijkdeskundigen'' (i.e. people who have expertise in practice). This means that the progress made by the project is regularly discussed and commented on by an advisory board comprising a broad spectrum of expertise in the area of NO.

A fourth factor is that the project, because of the nature of its activities encroaches on other curriculum development projects or even overlaps these. As a result several collaborations with other project groups both inside and outside the SLO have been set up.

The network that has been established is large and demands a great deal of time (and occassionally a lot of patience as well!). It is important to maintain a certain balance between curriculum development, on the one hand, and building up a network, on the other. Curriculum development without building up a network is inconceivable in the Netherlands. Yet, network building is not a goal in itself, it is there merely to assist curriculum development and to aid future implementation of materials already developed.

4. Operationalising the points of reference in themes

The importance that the development of themes has within the total development of the project was indicated in sec. 3.1 and the way the theme development took place was described in 3.2. This section shows how the points of reference of the project vis-a-vis didactics and content have been worked out in themes. This section is an elaboration of the questions posed in sec. 1. In the working out of the points of reference into themes, certain problems become apparent. This does not mean that the points of reference should be cast aside but rather that solutions should be found for these problems or that the validity of the points of reference should be restricted. The point of reference so far as they are relevant to content and didactics (as stated in 2.3) were worked into "the sketch for NO". The most important points of reference will now be discussed in 4.1, 4.2 and 4.3. Sec. 4.4 will describe a special study carried out on behalf of the project on the interest of students and their previous knowledge.

4.1. Context and the integration of school subjects

From the start of the project the concept "context" has played an important role. Initially "context" was understood to mean aspects of daily life and society and attempts were made to characterise context on the basis of a role analysis. But that does not provide a sharp enough definition nor does it make a sharp enough distinction from the concept "life environment". What is meant is of course clear - we are talking about the selecting, from out of a body of scientific knowledge, on the basis of its "usability", that bit which can be used to teach students about systems of which the student himself forms a part. Sec. 5.1 presents a matrix that can be thought of as an attempt at working out/systematising the concept "context".

Certain problems are inherent when it comes to making a choice on content because, in doing so, the traditional structure of the different school science subjects breaks down. The most important problems are the following:

1. How can the relationship between science content and contexts be worked out?
2. What relationship existst between the handling of context as selection criteria and the integration of school subjects?
3. What criteria are required to define themes?
4. What ordering criteria have to be used/can be used within themes in case a theme is related to only one context?
5. What happens to the relationship with other disciplines when context is used as a criterion for selection?

These questions will be discussed one by one.

1. How can the relationship between science content and contexts be worked out?

The question can be answered by giving examples of the way in which this relationship has been worked out in the units already developed. The theme "My clothes" is concerned with the enormous difference in the properties and functions of clothing. The theme begins with "the washing instruction label", something which already states many properties of clothing. Students are asked to write down the information that is given on the labels of their own clothing and that of their classmates. The details have to be entered in a table (see fig. 1).

Section --- The label

On the inside of most clothing there is a little piece of cloth on which some information is given: the label. Sometimes there are two or three labels to one item of clothing. You can see examples of these at the bottom of the page.

Task 1.1 Write down as precisely as possible what is printed on the label of one item of clothing. Do that as rough work. Use each other's clothing to do this. See that you have about six items of clothing.

Some labels give more information than others. On the next page there are some columns with spaces for all the possible details you can get on labels.

Task 1.2 Now write down the details from your rough work in the appropriate column on page 3. (If a particular label doesn't give all the details, leave that space blank).

Fig. 1. Fragment (1) from the theme "My Clothes" (second version) (Hondebrink, 1984)

This exercise is followed by a discussion on the different properties and functions of clothing. In a few cases, experiments are made on different types of textiles. One of the functions of clothing is moisture absorbency (fig. 2).

One of the functions of your clothes is to absorb moisture from your skin. Clothes do this without really getting wet themselves.
The moisture they absorb is then given out to the atmosphere.

In the next experiment we are going to measure how much water different types of cloth absorb. We are going to do this by measuring the maximum amount absorbed. So the cloth is going to get very wet.

Task 4.4 You are going to measure how much water different types of texiles can absorb.

You will need:

- Strips of cloth from different types of textiles, 2 cm. broad and 50 cm. long
- a pair of tweezers, a pair of scissors and a ruler
- a beaker and a measuring jug
- something on which you can leave the pieces to dry

a. Fill the measuring jug with exactly 100 ml. of water and pour this into the beaker.
b. With the help of the tweezers, soak one of the strips of cloth in the water for about half a minute.
c. Take the strip out and let the water in it drain into the beaker.
d. When it has almost stopped dripping, hang it up or leave it to dry.

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e. Pour the water from the beaker back into the measuring jug and take a reading of how much water there is.
f. Calculate how much water is left in the strip of cloth.
g. Note down your results in the format given below.
h. Repeat steps a to g for different types of textiles. Remember that if you want to make a fair comparison all your strips of cloth must have the same length and the same breadth.

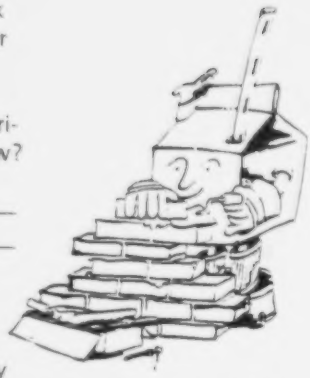
Type of Material	Amount of water absorbed in ml.
	100 - = ml.

Fig. 2. Fragment (2) from the theme "My Clothes" (Second version) (Hondebrink, 1984)

After students have done this experiment they are asked to use the knowledge they have acquired to answer questions about items of clothing that have a specific function e.g. swimsuits, towels, etc.

The theme "Milk" is about milk and milk products. This theme is concerned not only with the properties of milk (from cows and human beings) but also introduces, for example, concepts such as "building material" (proteins), "energy producing materials" (carbohydrates) and "protective substances" (vitamins) and applies them directly in the context of milk (fig. 3)

A part of the food we eat is called "building materials". These "building materials" look after growth, maintenance and repair in our bodies.



Task 3.7 Who needs more "building materials" - a calf or a fully grown cow? Why?

_____

_____

Milk contains "building materials": milk proteins and calcium.

A part of the food we eat is called "energy producing materials". These "energy producing materials" give our bodies energy.

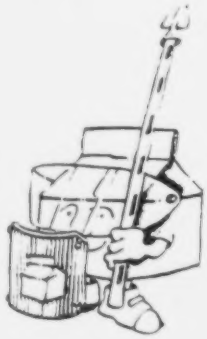
Task 3.8 Who needs more "energy producing material" - a calf left loose in a meadow or a calf that is tied up in a stall?
Why?

_____

_____

Milk contains energy producing materials: Milk fat and milk sugar.

A part of the food we eat is called "protective materials". These materials protect us from diseases and infection.



Task 3.9 In the first milk that a calf drinks from its mother, there is extra protective material. Can you think of reasons why this is so?

_____

The protective materials in milk are vitamins.

Because milk contains building materials, energy producing materials and protective materials, we say that milk is a complete food. It has a high nutritional value.

Fig. 3. Fragment from the theme "Milk" (1) (first version) (Abeln and Hondebrink, 1985)

The examples show that the content of science "lends itself" to a context (the label); at the same time, the content can be "applied" within a context (absorption, nutrition). Critics have pointed out the antithesis in ordering based on context and the introduction of scientific concepts and skills. There is indeed an opposition here, at least as long as we hang on to the idea of more or less traditional subject content. But the opposition disappears if the scientific content is selected on the basis of its applicability within contexts that are relevant for students and when this content is bound to certain aspects of the context.

2. What relationship existst between the handling of context as selection criteria and the integration of school subjects?

This question can be answered by showing which subjects come into play in the themes that have been developed. The theme "My clothes" deals with the immense variety in the properties and functions of clothing. It therefore includes elements of biology, physics and chemistry. The theme "Pets" is specially concerned with students working together, and with the collecting and working out of information about pets and their care. This theme therefore has mainly elements from biology.

The theme "Your house, a comfortable shelter" is largely concerned with the way physical factors decide the way in which a house offers shelter and how a comfortable "living climate" is maintained. The accent in this instance is on carrying out experiments. The theme "Soil and Environment" is concerned with the soil and environment in the direct vicinity of the students, and the impact human beings have on the soil and the organisms that live in it. The content is borrowed mainly from physical geography and biology. Relatively speaking, much attention is paid to fieldwork. Finally, the theme "Milk", which as mentioned earlier is about milk and milk products, borrows its content from biology, agriculture and chemistry.

The examples given above illustrate that a particular theme could draw upon elements from a greater variety of disciplines than another. Thus the standpoint - select content based on its "usability" within contexts - can lead us, in greater or lesser degree, to the integration of subjects at the level of the theme.

3. What criteria are required to define themes?

In the beginning, some themes (My Clothes; Pets) were developed without considering this question. Later, attempts were made to define the theme by means of a so-called central theme question. Doing this the internal consistency of a theme were increased, but it still did not provide an answer to the question of what content should be included. Furthermore, the question - what are the most relevant contexts? - could not be satisfactorily answered, so that the choice of themes (e.g. "Your house

- a comfortable shelter''; ''Milk'') was relatively arbitrary. Gradually it became clear that the only way to answer this question was to derive the themes from a previously drawn up draft curriculum. A deductive approach was necessary (see sec. 3.2 and sec. 5). On the basis of the procedure outlined in 5.3 the Integral Curriculum Design is worked out to conceptual networks. Themes could then be defined based on the possibility of working out parts of the network within contexts relevant to students*.

4. What ordering criteria have to be used/can be used within themes in case a theme is related to only one context?

The themes have been ordered in different ways as far as the common part is concerned (see 4.2). Two examples - ''My Clothes'' and ''Soil and Environment'' taken from the extremes of the scale will best illustrate the manner adopted. In the theme ''My Clothes'' different aspects of clothing come up for discussion. The science content associated with this theme has little underlying unity. The choice of the context ''Clothing'' decides the science content to be discussed. The choice is quite consistent with the idea that the context ''Clothing'' is the main goal and not a subordinate goal into which pre-established science content can be successfully introduced.

In the theme ''Soil and Environment'' a distinct subject structure is perceptible. This gives the theme itself a clearly recognizable structure, a structure which at various points refers to aspects of soil and environment in the students' own environment. This choice is consistent with the idea that ''established'' science content be offered within a context relevant to the student.

The first model brings along with it a number of problems for which there are at the moment no acceptable solutions. In the first place this assumes that statements can be made about the relative importance of contexts and the relative impact of elements of science which can be ''leant to'' (associated with) these contexts. In the second place, choices based on context imply that there is no logical argument against including non-science elements as well. As long as the boundaries of the subject area need to be kept in mind - and project NO 12-16 is concerned exclusively with science education - all sorts of objections can be raised. The second model is the one that is being used at the moment because the problems around the first model do not appear to have a satisfactory solution. The choice for the second model is closely connected to the choice for defining themes so as they come up for discussion here.

In sec. 6 we will return to the difficulties that might arise for students in cases where science content is related to a context within a theme which is related to the same context. The first model for ordering has not

* See sec. 6 for a discussion of problems related to this.

been permanently cast aside. In those cases where great diversity must be introduced in science content to work out a particular problem, then it is logical to use this model. Furthermore, it could be expected that in cases concerning the systematic development of concepts, especially abstract ones, the choice will be made for a cursory construction without the necessary connection with context being established.

5. What happens to the relationship with other disciplines when context is used as a criterion for selection?

In the above paragraph it has already been shown that when certain specific contexts are chosen (as goal) students see no logical reason why content from other disciplines cannot also be worked out. Some of the students criticised the theme "My Clothes" by saying that the writers had let slide all sorts of possibilities of working out non-science subjects e.g. creative subjects.

Students also appeared to associate the title of the theme "Your house, a comfortable shelter" with non-science content (see sec. 3.4). At the same time, teachers concerned with the subjects Technical orientation and, Health and Personal Care (this subject covers various aspects of 'taking care of something' ranging from personal hygiene and pets to the elderly) felt that the theme "My Clothes" could equally easily have fallen within their subject areas.

Apparently the boundary between the subject Natural Science on the one hand, and the subjects Technical orientation, Health and Personal Care becomes hazy as soon as the content of science is applied within contexts which are also important for both. Chapter 6 will go into this problem of boundaries in greater detail.

4.2. Heterogeneous groups

Since the project is aimed at NO in heterogeneous groups, two important questions for which answers should be found are the following:

1. In what ways must the themes be structured if heterogeneous groups have to work them out?
2. In what way can differentiation be allowed for within a theme?

The questions are, of course, closely related. The problem of organizing the material for heterogeneous groups has temporarily been solved by adopting a so-called kernel-option model for the themes. Each theme consists of texts for about 12-20 lessons. The texts must lend themselves to being worked out as independently as possible by small, heterogeneous groups of students. The texts are therefore largely self-directed. The kernel-option method can be characterised as follows: the kernel part covers not less than one-third and not more than two thirds of the total available lesson time for the theme. The kernel part comprises all the

communal instructional objectives of the theme but, in addition to this, differential objectives can also be worked into the kernel part. At the end of the kernel part it can be established if the communal instructional objectives have been attained (The aim is to reach 80 to 90% of the students).

At the end of the kernel part all the students simultaneously move on to the optional part. Hence the kernel part allows for possible differentiation in tempo. In the kernel part, students must carry out continually different types of learning activities. The optional part takes up one third to two thirds of the time available for each unit. Within this period every student must do at least one optional part. In principle there is a great choice in the optional part thereby allowing for different types of differentiation - difficulty level, type of topic and type of learning activity. The optional part can be linked to the communal instructional objectives of the kernel part or can be exclusively related to the differential objectives. The degree to which the optional part is structured varies enormously. The students can work out the optional part individually or in groups (differently composed). By way of illustration the titles for the optional part of the theme "Milk" and the way in which students are introduced to it, is given in Fig. 4.

The optional part - an overview.

Now that the kernel part is finished, it is time for the optional part. There are about 8 parts of which you must do at least 2.
You can work alone or in a group. Once you're decided what you're going to do, your teacher will give you the appropriate paper.
When you've finished a part you stick the completed paper on to a blank page. These blank pages are to be used to stick on the optional part. Given below is a brief description of the choices you have so that you can get some idea of what you can choose.

A. **How much fat does milk have?**
You must measure the amount of fat in butter, margarine, halvarine* and frituurvet**

B. **The boiling over of milk**
Why does milk boil over?
You must find this out by experimenting.
One period should be enough.

C. **There's grass and grass....**
The thing for cows is grass, at least in summer.
You must find out if a meadow (or a patch of grass) has only one kind of grass growing there.
Or are there more? You must look carefully and draw these.

D. **How to make Kwark*****
Make kwark using the same method in Sec. 6.

E. **How to make Gouda Cheese**
Task 6.1 is more complicated
You must make Gouda cheese. This is going to take somewhat longer to make.

F. **The Milkmachine**
You must look at a milk-machine, first of all on paper and then answer some questions on it. If it's possible, go to a farm and see one there.

G. **Cows and computers**
You must find out the way(s) in which a computer is used in a modern dairy farm. If it's possible, you should visit such a farm and see for yourself what happens there.

H. **Bacteria and Milk**
You are going to take two glass saucers full of milk and let bacteria grow in the milk. You will have to thin the milk several times in advance to find out at what stage there is no more bacteria left in the milk.

It is possible that there are more options or that some of the options stated are not yet available. Your teacher will tell you about this.

Fig. 4. Fragment from the theme Milk (2) (First Version) (Abeln and Hondebrink, 1985)

* A sort of low calorie spread, like Outline.
** Fat for deep frying; something like lard.
*** Kwark is a sort of cottage cheese.

Discussions with teachers from the avo/vwo**** schools in the project and practical experience in the experimental schools seem to suggest that the themes work less well with the two extremes of the population, the ibo**** students and the vwo**** students. In one of the experimental schools ibo**** versions were developed based on the themes already worked out. It is to be expected that the problem of "usability" over an entire student population will increase if in the later phases less heterogeneous classes and havo/vwo classes are included in the experiment. It is not yet clear if the "usability" problem for more homogeneous havo/vwo groups can be resolved by adapting the themes, especially the kernel section, and if this will, in the later stages of the project, lead to versions at different levels.

4.3. Interest and previous knowledge of the students

It is considered extremely important when developing themes to keep in mind the interests of students and their previous knowledge. The following question is crucial - In what ways can the themes be linked with the interests and previous learning of the students? Both points - interest and prior knowledge - throw up complicated problems. Interest is catered for by selecting themes which one might expect students to be interested in.

But then one must remember that the topic of the theme is only one of the factors which influences the motivation of learners. This problem cannot in principle be solved by the choice of the themes; neither can the problem relating to the development of themes to enable more girls and also more students from ethnic groups to choose science or to see a future in science education. The most realistic solution seems to be, as far as is possible (a) to choose content which is known to be of interest to 12-16 years olds; (b) to allow as much flexibility as possible within themes so that students can make their own choices; and (c) to shape the material in such a way that it can be easily handled.

In developing materials Project NO 12-16 has attempted to keep in mind the "stage" of cognitive development of students. There is, these days, very little left over of the importance attributed by some materials development specialists in the "stages of development" theory of Piaget.

It is currently considered necessary to structure the learning process in such a way that it can correspond with the conceptions or alternative frameworks of individual students. An attempt towards this can be found at the beginning of the theme "Pets". While testing the first version of the theme it became obvious that many students did not think of domestic animals as pets. Considering the emotional attachment many students have for pets, it was decided in the second version, not to force a definition of pets but instead to make a distinction between what each individual group thought of as pets and what the class in general agreed upon as a working definition.

**** See chapter 7.

1. Orientation

1.1 To have or not to have a pet
(To lead into the theme students are shown a video tape of the various aspect of taking care of pets.)

Task 1 What jobs were mentioned about taking care of pets that you hadn't already thought of?

_____

_____

_____

_____

On the video-tape a great deal was said about looking after animals but were all these animals pets? Is every animal that lives in or around the house a pet? Do they have to live inside your home to be called pets? What would you say about a watch dog in a kennel?

Task 2 Talk to each other about the best possible description of a pet. Write down this description in the space provided below.

_____

_____

_____

_____

Task 3 There are different opinions in the class about exactly what a pet is. Write down what the class thinks of as the most correct desciption. (We call this sort of description a definition.)

_____

_____

_____

_____

Fig. 5 Fragment from the theme "Pets" (Second version) (Ettekoven, 1985)

The project team has little evidence on this point at present because there are too few experimental results at hand concerning the ways in which the learning process can be structured. A great deal is expected from the model developed by Driver (Driver and Oldham, 1985) and also from the use made of cognitive maps within the learning process (Novak and Gowin, 1984).

Since much importance was attached to the interests and prior knowledge of students and because there was not enough literature or experience at hand, it was decided to submit (in 1983) a request for research into the interests and prior knowledge of 12-16 years olds. The setting up of this so-called SCO (i.e., Stichting Centrum voor Onderwijsonderzoek van de Universiteit van Amsterdam translated Foundation "Centre for Educational Research" of the University of Amsterdam) investigation is described in the following section.

4.4. The SCO investigation

In 1983 the project team formulated some research questions concerning the interests and prior knowledge of students. This led the SVO i.e., Stichting voor Onderzoek van het Onderwijs (translated: Foundation for Research in Education) to invite certain research institutions to formulate a research plan based on the research questions mentioned above. The SVO ultimately decided to let the SCO carry out the research. The investigation began in January 1985 and will run through to August 1986.

The SCO reformulated the research questions drawn up by the project team to make these more operational. More attention was paid on the one hand to the choices made in the research proposal, and on the other hand, also to the on-going developments concerning the Design for a Integral Curriculum for Natural Science. The following are the reformulated questions:

Ia What are the interests of 12-16 year old students vis-à-vis the subject matters?

Ib To what extent can these interests be differentiated with respect to students' sex, milieu (background), desired choice of profession and performance levels?

II What experience and pre-conceptions do students have regarding the content of the subject matters?

It can be expected that answers to these questions will provide valuable information for the development of specific curriculum and themes. The investigation will comprise both in-breadth and in-depth research directed to answering questions Ia and Ib and II respectively.

For the in-breadth investigation booklets have been put together comprising 44 topics ordered across 9 subject areas borrowed from the design of the major subject areas to be offered in the proposed comprehensive junior secondary education, i.e. the so-called Integral Curriculum

Design for VBaO. For each topic a brief illustrated introductory text was prepared to provide students with a broad orientation to the topic. The text is followed by four additional questions.

1. What else could you think of about ...?
2. What do you hope to learn or do at school on ...?
3. What do you think that ... is? Why is it that ...?
4. Why are ... being used more?

Questions 1, 3 and 4 are related to research questions (II) and question 2 is related to research question (Ia).

The list of questions has been worked out by 80 students from the sixth and second classes of an elementary and a secondary school respectively. The research results are not yet available. However, the results from a pilot study made in Juni 1986 on the topic "Your house" are available and we will come back to these shortly. Based on the qualitative research mentioned above a list of questions comprising 40-80 items was circulated among 500 students. Answer to these will provide a distribution of students characteristics and thereby provide an answer to research question (Ib).

The in-depth research is directed towards answering research question (II). For this work, clinical interviews have been used based on the method used by Nussbaum and Novick (1982) with exposing and discrepant events built in. Because of the labour intensive nature of this research method, only one topic can be investigated in this way. The research results will be available in August 1986.

Although SCO is conducting the investigation and is fully responsible for it, the collaboration with researchers in SLO is excellent. This can be seen from the fact that the pilot study (in which nearly 100 students from a school not associated with the project were involved) was carried out on the "context area" - "Your house" - and that the results of this study with respect to content were formulated as comments on the theme "Your house ..." developed by the project group. These comments illustrate the ways in which the SCO research will be useful in theme construction. By way of illustration, the three most important comments are given below.

1. The title "Your house, a comfortalbe shelter" (in Dutch Je Huis, een prettige beschutting) arouses false expectations from students they associate it strongly with psychological or sociological topics perhaps because of the connotations aroused by the Dutch word "prettig" which range from notions of comfort to "pleasure-giving".
2. Students show little interest in topics such as gas and electricity use; budgeting; saving; and insulation, all of which received a great deal of attention in the first version of the theme. However, students are definitely interested in the sources of gas and electricity; the working of gas and electricity meters; the pipes and connections in houses; and the working of gas and electrical appliances.

3. Students can lose interest when "doing experiments" is over-emphasized because they consider a number of other work methods equally attractive.

Comments such as those above serve as concrete suggestions for modifying/altering a theme.

5. The Design of the Integral Natural Science Curriculum

Labordus' paper has already dealt with the genesis and setting up of and the position that the subject should occupy in the proposed comprehensive junior secondary education. In sec. 3.2 we have already described the function the already mentioned Integral Curriculum has served in the progress of the project: it provided the stimulus for the first draft curriculum, precisely at the moment it became clear that in the development of themes, certain problems surfaced which could only be solved if the relationship between a draft curriculum and themes is deductively worked out (see Sec. 4.1).

This section discusses the manner in which the Design of the Integral Curriculum for Natural Science came into existence and ways in which it is currently being worked out as one or more draft school specific curricula. This method of operation provides data which contribute to answering the questions posed in Sec. 1 concerning products (teaching materials, publications), procedures and strategies which must be developed and handled so that the project can encompass both the current education system and the VBaO. The content of the Integral Curriculum will not be discussed in detail because this appears in full at the end of the paper*.

5.1. The Development of the Design of the Integral Curriculum for Naturral Science

In the development of the design of the major subject areas for the proposed comprehensive junior secondary education two considerations have played an important role:

a. The points of reference of Project NO 12-16 could be interpreted as a good way of working out the design but not as the only way of doing it.
b. A balance must be found between innovative changes and what is feasible within educational practice.

The steps taken to develop the document will now be described.

* See also chapter 5 in this book

1. First a matrix was designed displaying along one side the roles the students have in society now and in the future and along the other side a listing of system of which students form a part, the systems being so listed that each preceding system forms a part of the system that follows (See Fig. 6).

	a. Individual	b. Family/life environment	c. Street/neigbourhood	d. school/professional circle	e. Village/city	f. Holland	g. The world
1. The students as part of the natural world?							
2. The students as (future) user of the natural world, science and technology.							
3. The students as (future) participant in the world of work.							
4. The students as (future) participant in the world of leisure activities, recreation, etc.							

Fig. 6 Matrix used to assist selection of subject matters for the Integral Curriculum for Natural Science

Next members of the project team representing the different disciplines included in the project and who were at the same time involved with the development of the matrix were aksed to select science content using the matrix as basis. While selecting this content they were expected to keep in mind current innovative tendencies. This procedure resulted in a total of 121 topics ordered according to the roles set down in the matrix. This list was included in the draft of the design of the major subject areas for the proposed comprehensive junior secondary education.

2. Several groups, including the Advisory Committees for Curriculum Development of various subjects, commented on this draft in May. At the same time two subject discussions, each with around 25 experts were held. The experts were drawn from relevant teachers' associations, teacher training institutes, inspectorates, advisory bodies for curriculum development, environmental groups, development projects and universities. The written comments and reports of the discussions were analysed and recommendations for modifications formulated. The maximum criticism was directed at the matrix-based categories which in reality displayed too little balance in spread over the various categories (the categories "the students as participant in the world of leisure" and "the students as participant in the world of work" contributed harldy any topic. Criticism was levied too at the formulation according to discipline of the topics which were also supplied with a subject tag. Other, more general modifications for the entire Integral Curriculum included a restriction of not more than 50 elements or topics per subject area.

3. Based on these modifications the whole text was re-worked resulting in a new structure being designed. This structure comprises just five categories and per category, one or more sub-categories. The categories are based on a disctinction between "natural" and "human" systems. Within "natural" systems a further distinction is made between systems at object-level and those at super-object level. (e.g. eco-systems). Within "human" systems a differentiation is made between the category "construction" and the category "production". To complete the list, a further category was distinguished to take care of the influence of "construction" and "production" on natural systems at the super-object level.

Following this all elements were placed under one or the other of these five categories and were later further sub-categorised. Finally these elements were re-formulated so that their number could be reduced to 50*.

A few evaluative comments on the realisation of the design of the Integral Curriculum for Natural Science are in place. Although there was criticism levied at the first draft, it can be said that the steps taken thereafter were correct. First relevant context was selected and then this content was categorised. The mistake made was that in the process of consultation the content identified was insufficiently categorised. The first draft was in fact too much of an intermediary product.

Much criticism as also directed at the subject labeling in the first draft. It was felt that the integrated nature of the subject area should be emphasized in the formulation of elements. What was very noticeable was the

* See chapter 5 in this book.

fact that most of the critics were not really able to distinguish between formulation at macro and meso level and formulation at micro level. They missed the point that subject elements at macro level could be worked out to integrated science education at micro level. The initial decision to label subjects was deliberately made because the aim was to choose that formulation which could be used by most teachers. The experts consulted expected a great deal of the average teacher who even if he/she taught the Introduction to Natural Science at the Ibo** level usually did no more than give the ordinary biology, physics and/or chemistry lesson.

The categories ultimately chosen were not intended to provide visionary insight into the content of science education, this insight is contained in the elements themselves. The categories needed to have a strong meta-character because in actual fact a structure was being sought for content that had already been selected. A sub-division into different types of systems is obvious because the system concept (and an sub-division into different organizational levels) has a strong meta-character to it.

A fresh draft of the structure and the subject elements included in it was discussed in August 1985 with a group of about ten hand-picked specialists. All their comments were, as far as was possible, worked into a definitive text which appeared in September.

5.2. From a design of Integral Science Curriculum to a draft school specific curriculum

In Sec. 4.1 we stated that in developing themes certain problems arose which could be solved satisfactorily only if the themes could be derived deductively from the draft curriculum. This deductive procedure - which has only been partially worked out - must lead to a responsible definition of themes. For this it is of course necessary that there are publications at the level of school specific curriculum (conforming to project specifications and SLO policy; see Van Bruggen's paper). Above all, working out the fifty elements must lead to a situation where the first version of objectives for NO can appear in mid-1987.

The procedure (step by step) will now be described in brief.

1. The structure of the design of the Integral Curriculum for the proposed comprehensive junior secondary education is such that we might expect ordering to be possible between the elements distinguished, ordering to the extent that certain elements appear ahead of certain others. Criteria used to do this are:
(1) increasing complexity (several organizational levels); and
(2) application of elements after they have been introduced.

** See chapter 7 for abbreviations.

An Example.

1.2.1. Students learn about some of the most common plants and animals in their surroundings and learn how to co-exist responsibly along side these.

2.2.1. Students learn to recognize their own place and that of other organisms within cyclical and eco-systems and learn of both their dependence on these systems as well as their impact on them.

Element 1.2.1. must come ahead of 2.2.1. because some knowledge of the organisms themselves is required before their place in a larger system can be recognized. The intrinsic order for each element is established vis-à-vis the other elements. This has been done by designing a "relations" network with arrows indicating the intrinsic order among elements.

2. The next question is - how can fixed time slots be alloted within the "relations" network? This can be done by analyzing the subject elements for the abstract concepts that they implicitly or explicitly include. These concepts can then be organized according to semester (see illustration below); such an organization fits in with current educational practice and the literature available.

Power	: Semester	I; 2nd year
Energy	: Semester	I; 2nd year
Cyclical systems	: Semester	II; 2nd year
Eco-systems	: Semester	II; 2nd year
Molecules	: Semester	I; 3rd year

For the rest, at the time of writing this paper, it had not yet been established whether these abstract concepts needed to be fully assimilated or even if they care the only abstract concepts that are (either implicitly or explicitly) present.

Most of the subject elements in Category 1 were placed in the 1st year because so many of them deal with concrete objects and phenomena. By contrast the content elements in Category 5 were placed in the second semester of the 3rd year because they deal with complex relations between man, the environment and technology, and could be considered as a synthesis of the entire Integral Curriculum Design.

3. Following this, a short description was written for each element including its relationship with other elements. These descriptions and relationships will be converted into "concept maps" using the procedures described in Novak and Gowin (1984); each concept map contains the concepts and propositions comprised within one element only and those comprised in the relationship of that element to other elements. Altogether 50 concept maps will be drawn up.

4. Similar relational schema (as indicated in 2) were drawn up for skills.

5. On the basis of these relational scheme of concept and skill maps, a program proposal for a 3-year Natural Science course can be drawn up

from which, at a later period, a 2-year variant for lbo* and avo/lbo* schools can be derived.
6. Following this, profile sketches (based on the five documents described and on the points of reference of the project) can be drawn up. In step 6, for the first time, the specific points of reference and characteristics of project NO 12-16 are worked out. After step 5, other schools not included in the project could, for example, choose to develop a more cursory and less thematic program.

The program proposals and profile sketches will be presented to both the current and the newly included experimental schools. We expect that the schools will try out parts of the proposal and test whether these are workable in practice. This will then lead to modification of the curriculum proposal allowing Project NO 12-16 to wind up (mid-1988) with at least a partial empirical base to the proposal.

6. Unsolved Problems

In sec. 1 the following seminal problems were formulated:
1. What content and didactic choices must be made for a Junior Secondary Science Education Project if it is to make a satisfactory contribution to innovation in science education?
2. What products (teaching and learning materials and publications) must be developed and what accompanying procedures and strategies worked out, keeping in mind the fact that the project must cater to both the current education system and the proposed comprehensive junior secondary education.

The choices for question 1 have been worked out in sec. 4. It is expected that for most of the problems discussed in that section workable solutions can be found.

Choices made in connection with question 2 have been discussed in section 3 and 5. As far as we can predict at the moment, the procedures and strategies adopted should indeed lead to products (materials and publications) which could be of significant importance for the development of both the existing education system and the VBaO. We say "could lead" because the impact of the products developed for project NO 12-16 is not dependant solely on the quality of the products. But apart from the problems centred round impact - Jozefzoon's paper discusses among other things the way in which this impact can be measured - more fundamental problems can be distinguished inherent to the choices made for both seminal questions. These problems are indeed fundamental in the sense that they are not specific to Project NO 12-16 alone and, even more, cannot be solved within the development work carried out by the project.

* See chapter 7 for abbreviations.

a. A first fundamental problem that holds true for every project where context is the criterion for selection and ordering is that it is based on the premise that this choice to use context results in better transfer of content. Some critics have pointed out that context based ordering can itself cause a new "system separation" to be created. Consequently, students will not be in a position to apply what is learnt in one context to another. In particular, "context boundedness", where it concerns essential and/or abstract concepts, can be the cause of new problems.

How real this problem is cannot be judged in advance. Therefore it seems desirable that comparative type research in transfer be carried out. Some indication that this problem does play a role emerged from a mathematics project for 12-16 year olds where it was found that weak students in particular had more problems with transfer to their surroundings than better students did (Dekker, Herfst and Terwell, 1985).

On the other hand, research done for a Dutch development project on Physics (the PLON project) shows (currently at any rate) that "context boundedness" increases the chances of transfer (Wierstra, Personal Communication).

Apart from researching into the seriousness of this problem, there are two other ways to minimise the problem. One way would be to deal with it in toto (by covering it completely). All relevant contexts are so worked out that all important concepts pertaining to the context can also be worked out from the context. This possibility does not seem to be a particularly real one because it in fact presumes that transfer is unnecessary. Transfer remains essential because application situations can vary. Furthermore, the option demands for more lesson time than is currently available.

A second possibility would be to formulate certain conditions which must be satisfied. These conditions among others could be the following:

- that students be able to recognize the science content from the context in which it is learnt;
- that students be helped to recognize the ways and the criteria through which the content of science can be applied in other contexts.

These conditions demand not only learning **from** contexts but also learning **about** contexts and **about** the content of science. Among others Novak and Gowin (1985) have pointed out the importance of "meta-learning". In NO 12-16 we have thus far not been able to consider meta-learning.

It is also desirable that within a theme attention is paid not only to application in general but also, and especcially, to application in a variety of contexts. This too has not been done to a satisfactory extent.

To conclude point a), it seems desirable that themes have a recognizable structure. The path followed here to work out the Integral Curriculum for Natural Science seems to indicate as far as that is concerned than an opposition between subject structure and context boundedness is unnecessary.

b. A second problem is caused by the division into subject areas (such as that laid down for Comprehensive Junior Secondary Education as a result of which certain subject areas, all of which bearing on the material world, are separated out: Natural Science, Technology, Health and Personal Care*, Human beings and Society). Through this division into subject areas, Science, Technology and Society threaten to form three different streams, whereas internationally the move is in the direction of STS education.

In our present day society there is an urgent desire that science, the application of science, and the appreciation for this application be presented with an underlying unity to students. The separation of these subject areas at curriculum level does not of course mean that significant relations between these subjects in a school specific curriculum, thus at micro level cannot be satisfactorily worked out. Given current education practice, however, and espcecially keeping in mind that teachers are qualified in one subject alone, it seems an illusion to think that schools will opt for paths other than those prescribed or those that the qualifications of teachers seem to permit.

c. The third problem is the problem of longitudinality. The VBaO should be a period of uninterrupted basic education. This means that Project NO 12-16 and the Natural Science project for elementary education (also SLO run) should have a really tight fit. Yet neither project was begun with this perspective!

A major bottle-neck in longitudinal curriculum development is the lack of adequate criteria to judge what content and procedures are relevant and teachable to a particular age group. At the moment constructivist theories form the base with criteria being formulated for the relative sequencing of content and work methods. It is worth keeping in mind that longitudinal curriculum development is a problem that occurs at macro level (i.e. at the level of a national framework).

d. The final problem bears on the question - was the choice for a integrated curriculum for natural science education a reasonable choice to make with respect to innovation in Science Education for 12-16 years olds? Would it not have been better to make - as the first big step - a move to bring subject oriented science education closer to context oriented science education? The question is not whether integrated and context oriented science education is desirable, but rather **how** it can be realized. In the figure given below possible routes towards the realization of integrated context oriented Natural Science are indicated.

* See sec. 4.1. for explanation.

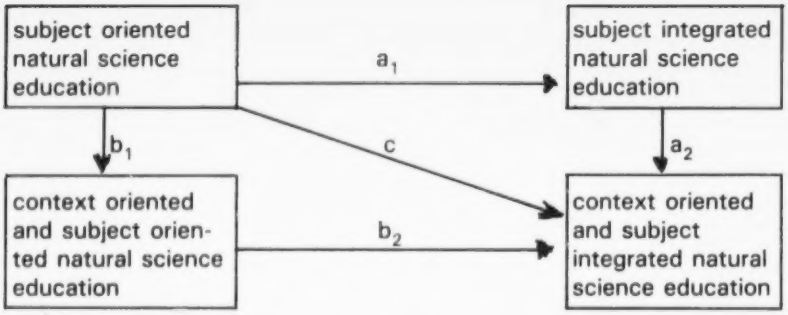


Fig. 7. Various possibilities for development from the current system to context oriented subject integrated science education

There is very little experience in the Netherlands with respect to (a), from subject oriented to subject integrated science education. Just a few schools have developed good and reasonably well subject integrated science education. The Netherlands has no development projects on subject integration (as shown in a_1, fig. 7); however, such projects do exist abroad. With respect to (b_1), there are currently in the Netherlands various types of on-going developments.

Examination committees for biology, chemistry and physics have made proposals for context and subject oriented science education. With respect to Physics, the PLON-project among others has spent more than 10 years on linking Physics to contexts relevant to students. There is no experience in the Netherlands with (b_2) apart from that gained by Project NO 12-16 on themes such as "Pets" and "Your house ...". Project NO 12-16 chose (c). The concern is that the innovative gap is so great that the chances of implementing the project are limited. Much depends on decision making in parliament on VBaO. Will the VBaO school be for all students between 12 and 15? If that is the case and if the Education Minister takes appropriate measures with respect to examinations, qualifications and in-service training then the chances of succesfull implementation seem to be quite high. But if that is not the case -and many people feel that that's what will come down to - then the VBaO will become just another name for the Ibo* and in all probability the achievements of the project will disappear into some filing cabinet or gather dust on bookshelves somewhere.

There are two activities the project could undertake which would visibly increase the chances of implementation, irrespective of the way the political current blows. In the first place an agreement should be made quite soon with an educational publisher to fully develop the teaching materials. In the Netherlands too the availability of a method is decisive for succesful implementation. In the second place, after July 1988

* See chapter 7.

(the time at which the project formally ends), work could be done based on the belief that the route to context oriented and subject integrated science education can also be approached via (b_1) and (b_2). The new final examination proposals could be used for this. Above all consideration could be given to working out a subject oriented version of the design of the Integral Curriculum for the proposed comprehensive junior secondary education. Then schools could, if they so choose, take the step towards context oriented and subject integrated science education via (b_1) and (b_2) or via (c). With this last problem point, the question - how should curriculum development be carried out if the chance of succesful implementation is to be maximised? - is split open.

The working out of ways through which the desired innovation can be implemented via steps where curriculum development also finds place, remains however just one of the factors which could contribute to succesfull implementation.

The tragedy of a curriculum development project is that a well developed project does not have to be a succesful project. The paper makes no contribution to the question of how a succesful project can be developed but hopefully it does show how a project that to a large measure aims at contributing to the innovation of Junior Secondary Science Education in the Netherlands can be properly developed.

5. Curriculum proposal for the natural sciences in comprehensive junior secondary education

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1. Introduction

In the studies Labordus and Boersma mentioned elsewhere in this booklet we find reference to a curriculum proposal produced by SLO for a new comprehensive junior secondary education, proposed by the Minister of Education and Sciences. This curriculum proposal was commissioned by the Minister of Education. It is published with as title **What Curriculum Would Be Offered in the New Comprehensive Junior Secondary Education?**

As described in Labordus's paper, the Minister of Education in 1985 developed a proposed legislation for comprehensive junior secondary education. This legislation is now before the Dutch parliament. It presents guidelines for contents to be offered in the area of comprehensive junior secondary education. In anticipation of the parliamentary discussion concerning this piece of legislation, the Minister of Education asked SLO to develop a curriculum proposal which conform to the guidelines of the proposed legislation.

Accordingly, in November of 1985, SLO presented its curriculum proposal to the Minister. The proposal described all disciplines in terms of what SLO considered to be the most important content and goals which should properly be made available the the secondary school system.

Following, by way of illustration, is a description of the discipline "natural sciences". We begin with several important elements from the proposed legislation that will determine the structuring of the curriculum proposal.

Principles for the curriculum of a school in the comprehensive junior secondary education system require that allowances be made for:

- postponement of compulsory study choices and vocational choices;
- continuation of the aim on the part of the elementary school to offer equal opportunities to all students to deploy their talents by making available a diversified curriculum;
- expansion of educational and developmental opportunities: in addition to the development of capability in the field of knowledge acquisition, there must be opportunity for the development of creative-artistic, technical, domestic and social skills;
- availability of suitable learning situations geared to the development of both individual and social dimensions.

The following requisites are set out in a draught for a law for secondary education [Ontwikkelingswet Voortgezet Onderwijs] in the form of goals to be achieved by comprehensive junior secondary education [VBaO] within a three-year curriculum:

1. Comprehensive junior secondary education should seek to continue elementary education in the same lines immediately upon its completion.
2. Comprehensive junior secondary education should, as a minimum,

provide all students with the opportunity for intellectual and emotional development, creative deployment, acquisition of knowledge and of basic social, cultural, physical, technical and servicing skills.

3. Comprehensive junior secondary education should promote the social and individual awareness of students and, through it, stimulate social survivability, maturity and servicability.
4. Comprehensive junior secondary education should prepare students for a choice of, and participation in, higher education and should motivate them to develop themselves further. To help students in this, comprehensive junior secondary education should acquaint students with the diverse types of higher education and apprise them of their own opportunities in this area.
5. Comprehensive junior secondary education should be geared to each student's interest level and his or her developmental capability and rate, taking into account each student's personal experiences and environment.
6. Comprehensive junior secondary education should help all students achieve a fundamental level in the various components of the educational program. This means that education should help each student obtain the highest possible level in the various program components.
7. Comprehensive junior secondary education should offer equal developmental opportunities for both girls and boys.
8. Comprehensive junior secondary education should take into account the multicultural nature of the Dutch society.

The educational program through which these goals are to be achieved should comprise, in integrated fashion, the following disciplines:

- Dutch language;
- Mathematics;
- Science;
- Man and society;
- Technology;
- Health and personal care;
- Communications;
- English, French and German;
- Esthetics and fine arts;
- Physical education.

The following schedules should be maintened:

disciplines *	
Dutch	267
Mathematics	267
Science	233
Man and society	233
English	233
2nd modern foreign language	200
3rd modern foreign language	33/167 **
Technology	200
Health and personal care	100
Communications	67
Esthetics and fine art	200
Physical education	200
Guidance/vocational orientation	133

The eight stated goals for comprehensive junior secondary education which apply equally to the entire curriculum are designed to provide a general guideline. The purpose of this curriculum proposal is to focus on the common content components of the program. By this we mean **those** components in the content that are intended for **all** students. Hence we are searching for a core curriculum whose offered **content** is in principle uniform for all students, although the level at which the content is presented will differ with the capabilities of the students.

These content components are seen as formulations in which contents are related as closely as possible to goals and to each other and by which the general goals of a specific discipline are subdivided into smaller units. In our formulation and selection of content components we considered as most important the following criteria:

- content components must be limited to defining the basic functions of the discipline; thus they do not -or perhaps only to a small degree clarify the discipline's contribution to general interdisciplinary goals;
- in principle, content components are not interchangeable, either within a specific discipline or among the various disciplines;
- content components are fundamentally equal in value; this means that no given component can be viewed as an extrapolation or refinement of another;

* Represents the number of lecture hours; in a three-year curriculum there are roughly 3000 lecture hours.

** The precise number depends on whether the student chooses a third modern foreign language.

- content components are intended to be taught to all 12- to 15-year olds; this implies the following:
  - in principle they **must be understandable** for that age category [although it may be necessary to devise different teaching methods];
  - in principle also they must be made available [evaluated on the basis of interpretations concerning the nature of fundamental education and orientative education].

In accordance with all these principles [concerning the goals of comprehensive junior secondary education and concerning the form used to describe the content], we have devised a concept for all disciplines. Following is the specific concept as it applies to the natural sciences.

2. Development and description of education in the natural sciences*

The current situation. Education for 12 to 16 year olds in the natural sciences rapidly changing. Within specific fields of the general discipline of science discussions are taking place concerning the need for modifications in the content and structure of these fields as school subjects. There are also clear indications that a movement is afoot to integrate the various fields into one broad curriculum discipline. The current structure of natural science education is dual in form. In the general branch of Secondary education [MAVO, HAVO and VWO**] only the separate subjects of biology, physics, chemistry and physical geography are legally prescribed. The lower vocational [branche LBO], on the other hand, has in addition to these separate subjects known as Knowledge of Nature [Nature Studies]. In 1973 this subject was first made mandatory for first year students in all schools for junior vocational secondary education [LBO**]. In reality, however, the subject Knowledge of Nature is very much biologically oriented. Only a few schools of this type strive to maintain a balance of subjects in their teaching of Knowledge of Nature. In the upper grades of some categories of vocational secondary education [LEAO and LHNO*], Knowledge of Nature may be taken as a credit course, but only if the subject material includes one or more of the separate fields of biology, physics or chemistry.

There is now also a proposal to prepare comprehensive university entrance exams for the subject. Schools that want to experiment with a broad field conception of the natural sciences must conform to the article in the **Wet op het Voortgezet Onderwijs** [the Secondary Education Act] dealing with such experimental projects. In addition to several schools participating in the comprehensive schools regular have also gone this

* From: I. Labordus and A. Gussenhoven [ed.]: Wat zouden ze krijgen in het voortgezet basisonderwijs, [translated: What Curriculum Would Be Offered In The New Comprehensive Junior Secondary Education], Enschede 1985.

** See for these abbreviations chapter 7.

route. These schools generally designate the subject as ''Orientation on Nature'' or ''Natural Science Education''. In the case of mergers between schools for general secondary education [AVO*] and schools for vocational secondary education [LBO*] in particular, a single subject, Science, has replaced all the others.

Tendencies. Within current education in the natural sciences the following general tendencies may be observed:
- Increasing practical work is filling the program. This is in any case true for lessons conducted within the classroom. Generally speaking, student activities are becoming increasingly more important.
- More attention is being given to students for whom education in the Natural Sciences will not be prolongated.
- Attempts are made to make education more relevant for students by correlating it with their current and future role. In determining the material to be presented, social relevance serves increasingly as an important criterion.
- There is increasing emphasis in the teaching of [higher] science education on the participation of female students. This is especially true for physics.
- Increasingly, efforts are made to focus on themes dealing with the related studies of natural science and human society, otherwise known as environmental studies.

Description of separate subjects. Following these general tendencies, we now describe briefly a number of developments taking place within the various science objects, using as reference the appropriate aspects set forth in the latest draught for a secondary education bill.

In biology a lively discussion currently taking place focuses on balanced content for the subject. While emphasis in the past tended to be on the physiological and biochemical aspects of biology, greater attention is now being demanded for ecological and human-biological aspects, with emphasis falling on concern for man's narural surroundings, man's responsibility- and stewardship toward organisms and the environment and the application of learning in everyday situations. Field work is becoming steadily more important.

Reforms in the area of natural science education concentrate on more thematic materials, with technical, environmental and social considerations playing an important role.

Within the last few years significant changes also been made in the teaching of chemistry. Noteworthy here is the increased attention being given to experiments as integral components of the lessons and -by introducing aspects from daily life- the attention accorded the environment and technology. The subject geography traditionally does not belong to

* See for these abbreviations chapter 7.

the natural sciences, although physical geography may suggest a close relationship with the natural sciences. Within the discipline of geography, educators have long discussed whether their approach should be descriptive or conceptual. But in geography, too, fieldwork is becoming increasingly more important. As yet, health is not a required subject, expect in some types of vocational secondary education [LHNO*]. Part of its subject is in the area of biology, part in the area of man and society. Agriculture ans environmental studies are also not traditonal science subjects. However, some components of agriculture an environmental studies fall under bioloy and geography. In the agrian brauch of vocational secondaru education, agriculture forms part of the curriculu. Here, studies in agriculture are being broadened: program materials are becoming more general and broadly formative; this trend signals a switch from narrow job specialization to a broader job orientation.

Nature studies. Within the last few years many discussions have addressed the advantages and drawbacks of integrating separate science subjects into the single subject of Nature Studies. Protagonists point to the similarity of methods and objectives in all these various subjects. Moreover, they see integration as an important avenue to:
- avoid radical divisions among the various subjects and to facilitate transfer from one area to another;
- achieve greater efficiency and results by eliminating unnecessary and unwanted duplication;
- obtain a form of education that will relate more closely to the student's life situation.

Antagonists argue that integration could lead to the oversimplification of the natural sciences, since the individual disciplines could not be developed sufficiently.

Schools that offer science as a single subject usually combine physics, chemistry, biology and some physical geography. Other aspects required according to the draught for a law for secondary education [health, agriculture, environmental studies] are not being realized in any school.

Schools that have adopted the single subject format [Nature Studies] have shifted the emphasis from narrow specialization to an approach that seeks to relate to the everyday life of students and to their experiences with natural phenomena. As well, there is a greater emphasis on experimentation and research.

3. Goals and sub-goals

General goal. According to the draught for a law for secondary education:

* See for these abbreviations chapter 7.

"Education in Nature Studies is in each instance directed at teaching those concepts of phenomena in nature that are essential for understanding coherence and lawfulness and, wherever necessary, applying them to situations of everyday life. Concomitantly, attention should be given to the aspects of conservation and environmental management. In each case, science education makes use of elements from chemistry, physics, health, biology, agriculture and geography".

The following general purpose for Nature Studies reformulates the above, thereby clarifying the fact that the discipline of Science relates both to the material world and the interaction of man with the material world.

Education in Nature Studies aims at enabling to acquire knowledge, insight, skills and attitudes concerning the material world [objects, organisms, phenomena, nature] and concerning the interaction between man and the material world, making use of elements from geography, biology, health, agriculture, physics, chemistry and applying these to situations of everyday life.

Sub-goals. This general purpose is specified in sub-goals concerning the material world and sub-goals pertaining to the skills with which the material world is to be approached. Sub-goals concerning the material world address knowledge, insight and attitudes.

Attitudes such as "purposeful interest in nature and natural science" and "concern for organisms and the environment" have great social value. It is therefore important for science to contribute to the development of such attitudes.

However, the problem with this is that specific, defined attitudes reflecting the nature of our appreciation and the measure of our concern cannot be taught systematically and therefore cannot be expressed in specific goals.

Nevertheless, the development of attitudes towards the material world can be encouraged by creating opportunities for students to become familiar with the material world. Thus, goal-setting can include those aspects of the material world that are open to the development of such attitudes. Sub-goals relating to the material world are listed in a way that distinguishes levels of organization [objects and phenomena versus levels of organization of a higher order] and distinguishes between laws and the application of laws through construction and production as well as the influence of construction and production on man and the environment.

Sub-goals pertaining to the material world:

1. Students acquire knowledge, insight and attitudes concerning objects, their attributes and their components.
2. Students acquire knowledge, insight and attitudes concerning the mu-

tual influence of objects and the influence of objects on their surroundings.
3. Students acquire knowledge, insight and attitudes concerning man-made systems, constructed on the basis of laws.
4. Students acquire knowledge, insight and attitudes concerning production processes developed on the basis of laws.
5. Students acquire knowledge, insight and attitudes concerning the influence of construction and production on the mutual interaction of objects and the interaction among objects, environment and technology.

These five sub-goals appear as categories on par. 4, these being the content of the Nature Studies subject. Sub-goals pertaining to skills refer to general skills used to treat objects.

Sub-goals pertaining to skills:

1. Students develop a number of research skills concerning objects and their interrelationships, such as observation, research methods, the use of graphics, tables, etc., the quantification of relationships among objects and the choice of variables.
2. Students develop a number of practical skills concerning the proper and safe use of materials and instruments and the judicious handling of living and non-living objects.
3. Students learn a number of technical skills, such as the use of apparatus according to instructions.
4. Students will learn that there are various means of handling nature and natural objects as well as different ways of handling the effects of science and technology; students will be enabled to develop their own attitude in this regard.

4. Description of educational materials

4.1. Elements of education materials

Sub-goals pertaining to the object of science, viz., the material world, are listed in categories of content. The categories themselves are subdivided into a number of sub-categories.

1. Objects and phenomena

1.1. A person's own body

Education materials are designed:

1. To teach students the simiralities and differences between man and animals.
2. To teach students how inheritable factors are transmitted, what this means for human variability, and how these factors become evident in man's growth and development.
3. To teach students how the body and its various parts function, and how this functioning is influenced by external factors.
4. To teach students which measures they can take, on the basis of scientific laws, to promote their own health and safety, and how they can further promote their own values concerning their own health and that of others.
5. To teach students the causes of a number of common diseasses and congenital abnormalities and to teach them what steps they can take to minimize or avoid such diseases and abnormalities.
6. To teach students the composition of food and the effect this has for preparing balanced meals.
7. To teach students to distinguish between natural and cultural differences among people and the effect these differences have on the way people deal with each other.
8. To teach students the role played by the senses and their respecitive aids in acquiring knowledge of the world.

1.2. Plants and animals

1. To teach students a number of common plants and animals from their surrounding and how to treat them responsibly.
2. To teach students to distinguish the characteristics of plants and animals in order to acquaint them with the diversity of organisms and their specific variability.
3. To teach students the relationship between structure, culture and care of plants and animals, and the way in which plants and animals are influenced by biological and a-biological factors, in particular those factors important to the care of plants and animals.

1.3. Materials and matter

1. To teach students to distinguish nature's materials and matter on the basis of physical and chemical characteristics [color, states, flammability, conductivity, etc.] and to teach them to see relationships among the various characteristics of matter and select specific applications.

2. To teach students that chemicals will react with each other, that man can make them react for a purpose and that many reactions take place irrespective of man.
3. To teach students the composition and characteristics of air and various types of water [distilled water, hard water, etc.].
4. To teach students about the important combustibles and acquaint them with the manner of combustion.
5. To teach students that materials can consist of various elements and that matter consists of molecules.
6. To teach students to recognize the effects of physical and chemical characteristics for the purpose of safe use.

1.4. Phenomena

To teach students a number of phenomena [ligth, sound, electricity, etc.], together with their place in daily living.

2. Object and surroundings

2.1. Surroundings

1. To teach students to use topographic and thematic charts and acquaint them with the way charts are made.
2. To teach students ro read weather charts, to understand a weather forecast and be familiar with the dominant features of their own climate.
3. To teach students to know and appreciate components of their own surroundings [landscape, biotopes, biological and a-biological elements, etc.]; be able to cite instances of how a-biological elements in their surrounding influence each other; discover how various components in the landscape originated.
4. To teach students about the solar system and explain the periodic changes in sun, moon, planets and stars.

2.2. Systems

1. To teach students to discover their place and that of other organisms in their surrounding with its life cycles and ecosystems, and to apprise them of their respective dependence and impact.
2. To teach students spatial and functional relationships among climate, soil, water, air, vegetation and topography.
3. To teach students the age and development of the earth and of life on the planet.

3. Construction

3.1. Tools

Educational materials are designed:

1. To teach students the power of tools and the meaning such knowledge of their power has for their safe use.

2. To teach students about the laws for the use of domestic tools and the importance of this for their safe use.

3.2. Architecture and use of energy

1. To teach students which laws are to be observed for the construction of buildings.
2. To teach students which laws are used to determine the support structure of a house, and what steps can be taken to improve support in a structure.
3. To teach students the various types of domestic energy supplies, the different ways of consuming energy and the effect this has on energy efficiency and the safe use of various appliances.

3.3. Transportation and communication systems

1. To teach students several laws on which transportation is based [flying, driving, boating].
2. To teach students the role played by the different forces in traffic situations and the measures that can be taken, on the basis of this knowledge, to improve safety.
3. To teach students how modern means of communications function on the basis of their respective laws.
4. To teach students the principle of electronic data processing.
5. To teach students the principles of biological communication systems, as well as their functions as they apply to individuals and groups.

4. Production

4.1. Agrarian production

Educational materials are designed:

1. To teach students about the commonly used processes for preservation and to see which materials and processes are essential to the production and processing of food.

2. To teach students a number of important vegetable and animal products, together with their origin and means of production and processing.
3. To teach students the means by which the growth of animals and plants is manipulated for the benefit of agricultural production.
4. To teach students the importance of agricultural production and the ligitimations on agriculture imposed by soil and climate.

4.2. Production of materials

1. To teach students in what way and by what processes materials [metals, synthetic frabrics, plastics, soap, etc.] are produced.
2. To teach students about the origin and exploitation of natural resources such as clay, water, sand, oil, gas and coal.
3. To teach students a number of industrial processes.

4.3. Energy sources

1. To teach students various forms of energy, together with examples of energy conversion.
2. To teach students various sources of energy and the exploitation, storage and tranportation of the product.

5. Man, environment and technology

Educational materials are designed:

1. To teach students the impact of the means of production, for example, of food and energy, and the impact of construction [houses, roads] on the environment.
2. To teach students the importance of conservation and proper management of nature and to promote values in the area of how man deals with nature, the environment and technology.
3. To teach students to see how people everywhere differ in their assessment of how man should approach nature, the environment and technology, depending on their cultural development and economic involvement.
4. To teach students to recognize the impact of energy losses in food chains, including those in global context.
5. To teach students to recognize that the population explosion together with increases in food and energy production can lead to the depletion of natural resources.
6. To teach students how Dutch cultural regions originated, which processes played a role in their formation and, on this basis, which steps may be taken to ensure their survival or effect their construction.

4.2. Pedagogical-didactic description

Practical work. In the sub-goals with skills [par. 3] there is mention of research skills and practical and technical skills. More specifically, this has to do with the following skills:
- taking observation of objects and processes;
- collecting, classifying and interpreting data;
- making proper and safe use of materials and instruments;
- caring for living organisms;
- purposeful influencing of situations.

Activities in which students themselves handle particular aspects of the material world are of great importance in learning these skills. This does not only apply to practical activities carried out in school, but also practical activities carried out in the context of the object's own surroundings [as in field work].

By doing practical work, students not only acquire a number of skills. Practical work can also enable them to draw the relationship between theory and practice, in which the practical work -depending on how it is organised- can contribute either to the development of the theory or to the application of what is already known.

Through practical work, students can also create conditions by which their attitudes towards specific aspects of the material world can develop, as, for example, in the promotion of safety consciousness or environment consciousness. Safety consciousness allow students to realize the effects of their actions on themselves and on others. Improper use of laboratory burners and glass can cause serious injuries. Similarly, in promoting environment consciousness, it is important to teach students to understand the effect of certain activities, such as care for living organisms both in and outside the classroom or the disposal of chemical waste from experiments.

Practical activities such as those conducted in the field teach students that elements within their environment interact and depend on other elements. Examples of field work include studying fresh water ecosystems to determine the quality of the water, or soil drilling to determine the buildup of the various soil strata.

Finally, practical activities also offer good opportunities for differentiation according for the student interest and achievement level as well as opportunities for group work featuring a division of tasks. Assignments can be handed out according to different degrees or complexity. As well, an assignment in which everything is laid out for the student requires different skills from one in which students are required to do their own research on their own initiative. By being motivated to do his own research, a student's interest is perhaps more easily stimulated.

Working in groups. Working in small groups of three or four students will give them an opportunity to learn to work independently and also practice

their social skills. They can discuss with each other and correct or supplement each other without intervention by the teacher. Hence, students practice cooperation, a skill with great social significance, by trial and error. It should be noted that guidance of such groups is essential in order to avoid a division of labour based on a stereotype role-playing of boys and girls.

Group activities, much more than the classroom reaching, offers greater opportunities to relate to the personal experience of the individual student. By allowing students to carry the ball, they can introduce their own knowledge and experience. In this way it is also possible to discover their perception of natural events, giving the teacher a greater chance to work with them. As an example, small groups may first be asked to come to an agreement about what they consider to be an accurate description of domestic animals. These descriptions could then be discussed in class, following which they might be asked for an agreement on a definitive description.

Group activities can also help achieve certain differential goals, as by giving them assignments with varying difficulty factors. However, the concept of group activities does not trivialize classroom teaching. This remains important, as in the case of discussions on the results of activities, demonstrations, etc.

The world of experiences and its contexts. General goals for comprehensive junior secondary education must take into account the student's world of experience. Not only practical and groups activities contribute to this, but so does the selection and stucturing of curriculum content. Important in the selection of contents is the need to make choices that are relevant to the current and future role of students. This rule of thumb is found in the formulation of the contents of the subject Science. As for structuring these contents, it is important to arrange the contents arround topics that make sense to students and with which they are familiar. The term "contextual science" might be in order. Two examples should illustrate the point.

The topic "clothing" can serve to introduce several scientific consideration concerns the knowledge of materials, their properties and their suitability. Other considerations: the item's warmth retention properties in relation to the body's thermal production; the item's humidity retention or repulsion in relation to the body's loss of humidity. The topic of "clothing" might be introduced to student by having them examine the labels in their own clothing. This particular acitivity is indeed a very personal agreement for students and will raise the question of symbols and brand names. This could later result in a more scientific study.

The topic "milk" will result in discussions not only on food and diet but also the production of milk itself. For most families, milk is a common enough commodity. Yet many students know little about it. What it contains, where it comes from and why it spoils are questions that often

mystify students. However, some care is advised in making things relevant to the student's world of experience. Regarding this world of experience, distinctions must be made between
- their real surroundings, or the world around them;
- their subjective experiences, or their expriental world;
- their perceptions and notions concerning the material world.

One should not underestimate the difficulty in relating to thier real world, their experiental world and their perceptions and notions. A few examples are in order. In the first place, relatively little is known about students' experiental world and their perceptions and notions concerning the material world. Strategies to get to the bottom of this are not advanced.

Secondly, there are currently no uniform criteria to ascertain the relevance of content matererial for students. Similarly, there are no criteria to determine the relative value of various contexts.

Thirdly, experiential worlds as well as perceptions and notions differ sharply among students themselves. A student from the countryside will have a different real and experiential world, as well as different perceptions and notions, than a student from the city. Specifically, this means a teacher will encounter numerous problems on relating adequately to the experiential worlds of this students.

Boys and girls. The participation of girls in the current curriculum of natural science is comparatively small; it is therefore important for more girls to participate in scientific higher education and acquire knowledge and skills identical to those of boys. Differences between boys and girls can be found not only in the areas of knowledge, skills and experiences, but also in the difference in perception and conduct between boys and girls. These differences affect the way in which content elements are presented. With respect to the further implementation of the content elements, there are basically two choices. First, in addition to sexually neutral subjects it may be possible to offer specifically male and female topics in equal number. However, here the danger of stereotyping increases. Second, it may be possible to throw an entirely new light on specifically male and female topics. For example, the topic "home" could be approached from any of a number of factors dealing with climate management. In this way, students could conceivably discover their interest and talent for science without the stigma of sex.

A differentiated application of this topic would feature a diversity of possible materials which would do away with uniformity. In addition, the teacher should moderate or avoid any stereotypical role playing, and employ only those methods that promote the equality of students.

4.3 Examples of implementation

Section 4.1 divides the content elements into five categories. In the following, one content element from each of the five categories is ex-

panded upon, keeping in mind the integral goals of VBaO [comprehensive junior secondary education].

In category 1, "Objects and phenomena", the central point is the treatment of concrete material. That is expressed in content element 1.2.3., among others: "To teach students the relationship between structure, culture and care of plants and animals, and the way in which plants and animals are influenced by biological and a-biological factors, in particular those factors important to the care of plants and animals." Developed more stringently and applied to animals only, this can lead to a discussion on "domestic animals". Nearly all students have some experience with domestic pets and can be expected to have some knowledge of them.

This knowledge and experience may then be further systematised and expanded. Following are some angles that might come up for discussion:

- the relationship between the structure and function of a part of the animal's body;
- common diseases among pets; therapy and preventive care;
- the relationship between the type of food and the animal's dental structure;
- the relationship between the animal's appearance at birth and the time it takes for weaning.

Students could gather their own data, possibly in groups, by observing their own pets, by contacting experts or by consulting appropriate books, video tapes, films, etc.. The findings could then be reported in class. This procedure also reinforces some of the skills mentioned in 3. This method places the aspect of care for animals within the context of increasing knowledge and insight concerning the functions and needs of pets. The purpose is to provide better care for pets. The procedure enables students to develop their attitude towards caring for pets.

Using a differential implementation of this content element, it may also be possible to conduct further research into packaged pet food, trace the history of pets to their origins in the wild and study the breeding habits of various pets.

In category 2, "Object and surroundings", the content element is defined as "To teach students to read weather charts, to understand a weather forecast and be familiar with the dominant features of their own climate" [2.1.2.]. In conjunction with content element 2.1.1. [the use of topographic and thematic charts] as well as content element 2.1.3. [components of students' own surroundings], this procedure could lead to the development of a topic such as "weather forecasting". Quite possibly, some components of this topic were already dealt with in elementary school [in any case true for schools that use material from the project called Science for the Elementary school]. Students from those schools have probably learned to read temperature, measure wind speed and precipitation.

Comprehensive junior secondary education can tie in with this experience by emphasising:
- making tables and diagrams of weather data collected during a specific period from a certain area;
- interpreting simple weather charts;
- studying the relationship between the growth cycle of plants and the variations in temperature, humidity and light during the growth period;
- finding weather data important to, say, agriculture.

Emphasising these aspects will create ample opportunity for practical work: students have to take and interpet the measurements themselves. By tying this in with agriculture, students learn to see that weather forecasting is of critical importance to certain vocations.

A further differential implementation of this content element could investigate the effect of weather patterns on the growth processes of plants, the interaction of plants and animals; the physical reasons for precipitation and other phenomena [depressions, high pressure zones, etc.], the specific meaning of certain cloud formations signalling the approach of a front, the limitations on certain methods of measurement.

For category 3, "Construction", the content element is defined as follows [3.2.2.]: "To teach students which laws are used to determine the support structure of a house, and what steps can be taken to improve support in a structure." A more elaborate description of this content element might emphasise the measurable physical variables in the "living climate" within the house. The following aspects might be considered:
- measuring a number of physical variables dealing with electricity, light, warmth, humidity, draft;
- the relationship between these measurements and the comfort provided by the home;
- steps that can be taken to improve the comfort.

This topic could manifest both experimental skills and data collecting and processing skills. A differential implementation of this content element could further explore diverse types of insulation and their effect on man; the relationship between living in the Netherlands and elsewhere; the way people live as compared to animals.

In category 4, "Production", item 4.1.1. describes the content element as follows: "To teach students about the commonly used processes for preservation and to see which materials and processes are essential to the production and processing of food." Important questions here are: Why use preserves? How can you preserve food safely? This topic might introduce the following aspects [whether or not in conjunction with other content elements]:
- the how and why certain important foodstuffs [milk, bread, etc.] are processed before they are considered suitable for human consumption;
- diverse methods of preservation, such as freezing, heating, salinating, together with their principles;

- the role played by bacteria in both processing and spoilation; conducating of a number of bacteriological experiments;
- the consequences of processing and preserving food on man and the environment.

A differential implementation of this content element might further explore the processes that cause decay and the scientific reasons behind several means of preservation; it might increase experimental skills and also investigate the relationship between food processing and food preservation on the one hand, and climatological and economic circumstances, on the other.

In category 5, "Man, environment and technology", the content element stated in 5.2. runs as follows: "To teach students the importance of the conservation and proper management of nature and to promote values in the area of how man deals with nature, the environment and technology." A further application of this content element could focus on soil. Here the following might be addressed:
- the functions of soil for man, plants and animals;
- properties of and processes in the soil that are important for man's life;
- testing soil samples;
- man's use of soil and the resultant impact on the environment.

The last item especially provides the opportunity for students to discover and experience the various factors at work in soil use. Thus the topic lends itself well to being involved with nature. A differential implementation of this content element might delve deeper and further into concepts such as "life cycle" and "ecosystem"; develop certain field work techniques; investigate the effects of soil pollution on vegetation.

5. Concerning coherence

Education in Nature Studies is directed to the material world, making use of elements from physics, chemistry, biology, health, agriculture and geography, and is designed to enable students to develop knowledge, insight and skills in order to approach the material world. In addition to Nature Studies, however, other subjects also address the material world, which makes it imperative that the contributions made by each of these subjects be carefully circumscribed, the more so because students should be offered an overview of the coherent subjects. Important in this regard are subjects such as the one dealing with the relationship between Nature Studies and Technology, Health and Social Care and Man and Society.

Technology. Education in Technology aims at familiarizing students with technology. It is directed partly at the development of technical activity, partly at the development of knowledge and insight pertaining to techno-

logical phenomena. In all cases technological phenomena can be traced back to scientific phenomena. Accordingly, in many cases scientific laws are applied to technology and scientific conditions are established for technological development. Thus, technology cannot survive without science, and this is equally true for education in the Technology subject. Conversely, education in Nature Studies cannot do without technology, since the contents selected for Nature Studies must be of importance to the everyday life of students. Contents for Nature Studies have been selected on the basis of their importance in relationship to, among others, technology.

Technology is obviously also geared to increasing knowledge and insight of technical phenomena found in matter, energy and communication. It is essential for students that education in the scientific and technological aspects of matter, energy and communications - to the extent such education is designed to acquire knowledge and insight - is presented in a cooperative framework in view of the fact that they reinforce and complement each other. Teachers in both Nature Studies and Technology will therefore have to work at this together and possible arrange some form of team-teaching.

The content elements of Nature Studies were listed under 1.3. [Materials and matter]; 3.1. [Tools]; 3.2. [Architecture]; 3.3. [Transportation and communication systems]; 4.2. [Production of materials]; 4.3. [Energy sources].

Content elements dealing with the scientific and technological aspects of matter, energy and communications support unilaterally those content elements of Technology that aim at applying technical skills. These content elements can be worked out by teachers of Technology after the above content elements have been formulated in cooperation with teachers in the field of Nature Studies.

The sequence in which implementation of content elements regarding application and technical skills takes place can then be determined more closely, recognizing that from didactic considerations it is not strictly necessary to offer these content elements to students only after they have been given the cognitive content elements.

Health and Personal Care. The discipline Health and Personal Care is designed to teach skills in the areas of service and care for man and his surroundings. Many essential activities dealing with the care of people and their surroundings are related to scientific phenomena and laws, and in many cases the application of scientific laws can lead to an improvement in the quality of life. Knowledge and insight concerning care for people and their surroundings would function more productively if applied to the broader context of knowledge and insight concerning the systems in which man plays his part. For reasons similar to those applied to Technology [see above], Nature Studies has also been given those content elements which are important to students in terms of health, safety and

care for plants and animals. It is therefore essential for teachers of both Nature Studies and Health and Personal Care to cooperate in reaching agreement on what content elements to teach in their respective subjects.

The content elements of Nature Studies were listed under 1.1. [A person's own body]; 1.2. [Plants and animals]; 3.1. [Tools]; 3.2. [Architecture]; 3.3. [Transportation and communication systems]; 4.1. [Agragian production]. These content elements support unilaterally the content elements of Health and Personal Care, which, in turn, are related to health, safety and plants and animals.

Through further amplification, contents with an emphasis on phenomena and laws might be taught by teachers in Nature Studies, while contents with an emphasis on systematic teaching of related skills might be taught by teachers of Health and Personal Care. Once again, agreement will have to be reached by both groups of teachers regarding the sequencing of the material concerned. Again, it is not necessary to defer teaching the content elements of Health and Personal Care until after the corresponding content elements of Nature Studies have been dealt with.

Man and Society. The subject of Man and Society serves, among other things, to focus attention on relevant topics from the social and political arenas. Within social and political reality, technology and, in a general sense, scientific laws often play an important role, because it is widely expected of scientists that they can contribute significantly to the resolution of pressing social problems. Despite the fact that such expectations are frequently misplaced, knowledge and insight concerning the material causes of social problems frequently supplies important preliminary information essential in the type of education that analyses, defines and solves social problems. This is, for example, very much the case with projects or ploblems resulting from man's scientific activities, as in the case of the environment.

Dialogue between teachers in both Nature Studies and Man and Society will have to establish to what extent the topic of "man and the environment" can benefit only from a multiperspectival approach, in which the contents, based on two different approaches, are presented in separate lectures and, moreover, in which scientific contents function as relevant preliminary information.

An alternative approach might be to include certain aspects of Man and Society in Nature Studies and vice versa, on the rationale that aspects of the material world always obtain meaning in a social context and that the social world always has a material base. This alternative incorporates not only the multiperspectival approach, but also provides mutual reinforcement.

If the choice is made for a problem oriented approach, a mutual implementation of the formulated content elements of both disciplines bearing on such problems is highly desirable. Such implementation could lead to,

say, a project in which teachers from both Nature Studies and Man and Society participate.

The content elements of Nature Studies that are here relevant were listed under 5. [Man, environment and technology].

Communications. In 3.3. [Transportation and communications] we formulated several content elements that apply to the principles and laws for means of communication and data processing. These content elements could play a supportive role regarding the content elements of the Communications discipline.

In addition, it is possible to develop certain content elements from Communications in the context of the natural sciences. In that sense, content elements from Communications could serve to enrich science education, particularly where it concerns simulations of processes that are difficult to study in reality. Further implementation could lead to a multiperspectival approach to one or more themes.

6. Clarification and accounting

Selection of content elements. In selecting the content elements, we did not first of all proceed from existing programs for science subjects in the lower grades of the secondary education school system [lbo/mavo/havo/-vwo schools*].
Contents have been selected anew on the basis of their utility, their instructability and the learnability of all students. The criterion here used concerns the ability to relate these contens to the relevant contexts in which all students find themselves.

Organization of content elements. In devising the categories for this new concept of content elements, the choice fell on categories in which the material world is subdivided in objects and phenomena and elements that point to a higher level of organization. The categories "Construction" and "Production" feature content elements that raises the issue of man's purposeful dealings with his surroundings. The last category, "Man, environment and technology", features content elements that relate to the influence of human actions on life cycles and ecosystems of which he himself is a part.

For the most part, the categories tie in with the areas of interest formulated by the project "Natural Sciences for primary education" [SLO-project number 3213]. Moreover, the [sub]categories have been selected in a way that makes it easy to relate content elements to contexts that are relevant to students.

* For abbreviation see chapter 7.

Integral goals for Comprehensive Junior Secondary education [VBaO*]. Formulated areas of interest such as the goals of natural science education for higher education conform to the general goals and separate categories defined for comprehensive junior secondary education [VBaO*]. These areas of interest include: one's own body; plants; animals; materials and objects; surroundings; weather and seasons; phenomena. This makes it possible to expand the content elements in such a way that foundational education in the natural sciences can follow uninterruptedly upon elementary schooling.

Education in the natural sciences puts the emphasis on active dealings with the material world, designed to promote systematic conceptual development and the development of skills and attitudes. Such education shall not, however, in first instance aim at the development of creativity and emotional aspects, even though attention may be drawn to these aspects during the implementation of the content elements.

The influence of man, collectively and individually, on himself [health, diet] and on his surroundings is taken seriously by science education. Several content elements refer to this influence. Together with the manner of selecting content elements, the presence of human influence shows that science education places strong emphasis on the student's consciousness.

The means by which third year students should be prepared for science education in more advanced levels must still be defined more comprehensively. However, the formulated content elements are of such a nature that it may well be possible to so define those levels according to the structure of the diverse natural sciences, and thus provide for the student a sound introduction into the advanced levels of natural science education. Taken together, the content elements offer students the opportunity to achieve a fundamental level in scientific material that is important, and will continue to be important, for their daily individual and social lives. In that sense, the term "comprehensive education" is appropriate. It is not possible to achieve a specialized scientific level in each of the separate natural sciences. To achieve this, it would be necessary for students to master only abstract scientific concepts and techniques. This is not possible, partly because of the unfeasibility of learning these abstract concepts and techniques, partly because of the shortage of time. However, some of these concepts and techniques could conceivably be taught to some of the students as part of a number of differential content elements. However, the material presented here could enable advanced levels of education which by definition are geared to the more abstract concepts and techniques to tie in with the experience gained by comprehensive junior secondary education [VBaO]. This is certainly possible if the pedagogic-didactic techniques defined in 4.2. are retained.

* For abbreviation see chapter 7.

Tying in to individual interests and potentials as well as to the experiential world of students can only become manifest if the content elements are more thoroughly defined, both according to content and didactic methods. Realizing equal opportunities for both girls and boys, as well as taking into account the cultural roots of all students, must also be made more manifest by working out in greater detail the various content elements.

Integration. The way in which content elements have been formulated and organized make it clear that Nature Studies is to be presented as an integrated subject. This is certainly the case if schools attach great importance to implementing content elements within contexts that are relevant for students. This does not mean, however, that content elements should not be developed to also function within existing subjects such as geography, biology, physics and chemistry. In such an event, however, it must be agreed which of these subjects will teach the content elements of health and agriculture.

But in regard to a number of content elements, subject integration is strongly recommended. This is true of the content elements listed in category 5., "Man, Environment and Technology", where elements from not only the various scientific subjects but also from the subject Man and Society are closely tied in with each other. A further articulation could lead to at least partially integrated science education, as, for example, in the form of one or more projects involving content elements that are clearly interdisciplinary in nature and that should be presented in coherence.

Eddy O.I. Jozefzoon

6. Use and impact of some SLO-publications

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1. Introduction: Question posed and approach to the answer*

The topic of this symposium is "Coordinating Curriculum Policy and Practice: the Innovative Role of the Dutch National Institute for Curriculum Development". The presentations by Boersma, Van Bruggen and Labordus already gave a more or less extensive idea of what the SLO is doing (i.e. the tasks), how these tasks are completed and the problems confronted in the course of completing such tasks. Also the implementation of support documents produced by the Dutch National Institute for Curriculum Development (SLO) and their impact were more or less extensively discussed. Labordus for example observed how difficult it is to evaluate the role of these support documents in educational innovation or to determine the impact of curriculum development on policy development. Also Van Bruggen pointed out this difficulty, especially when one is to evaluate the impact of SLO-publications on students' results or to determine the effect of factual implementation of ideas from SLO-publications by teachers, in their educational programme or the planning thereof. Such evaluations, according to Van Bruggen, are rather difficult to make, without intensive and large-scale class observation. However, he also quoted some succesful SLO products.

In this presentation I wish to make a systematic investigation into the utilization and impact of SLO publications by discussing five studies, of which four are on utilization and usefulness of curricula which were produced by the SLO. The fifth study deals with the question what teachers know about the identity and working of the SLO. In the second chapter of this presentation I shall give a concise description of the studies mentioned. I shall therefore not discuss here any other data the SLO has available and which illuminate the utilization and the impact of SLO activities. In the third chapter of my presentation I shall discuss in detail some of the studies that were carried out. The central question here will be in how far general conclusions should be drawn from the results of those studies. Should the study results lead to conclusions with regard to the functioning of the SLO as a whole? The problems presented will be more methodological in character. The third chapter is therefore meta-evaluative - an apreciation of the quality of the evaluation-studies. Chapter Four details shortly with some three problems which are inherent to an investigation into the impact** of every national curriculum development institute, like SLO, OISE, the former Schools Council in England and the Curriculum Development Centre in Australia. I shall therefore avail myself of data from earlier impact-studies, namely the evaluation-study on "The impact of research, development and field activities of "The Ontario Institute for Studies in Education" (1978) and the "Impact and Take-Up Pro-

* I hereby wish to thank E.K. Marshall with whom I shared and discussed the first ideas for this paper and for his criticisms to the draft versions. Thanks also to A. Lahuis, J.C. van Bruggen and K. Boersma for their critical comments.

** In 2.3. we shall discuss this term extensively.

ject" of the Schools Council in England (1976-1981). The objective of the second research project was "the investigation of the impact and take-up of Schools Council projects in the full range of schools". (Steadman a.o. 1978; 1). The first problem has to do with the determination of the effect of activities of a national institute for curriculum development on the learning behaviour of pupils. The second problem refers to the isolation of the working share of the institute's activities in educational development and/or innovation. The third problem is connected with the fundamental idea, that evaluation of a national institute for curriculum development takes place in the field of forces of groups of power and interests. In the fourth paragraph I shall draw some conclusions for you to think over.

2. Take-Up and impact of SLO products

2.1 Introduction: the SLO makes support documents for curriculum development activities

The central question in this chapter is the take-up and impact of SLO-products. From preceding presentations, it is clear that the SLO makes support documents for the development of different types of curricula. It has also become clear that these different types of support documents are prepared in different ways. But also that they have different functions, dependent to a great extent, on the demands and needs of the group for which they are prepared. My colleagues already said that the SLO works for various target groups: the government, independent schools, school communities, school types, educational levels and innovation projects.

It is obvious that not all SLO-products are applicable to all the above mentioned target groups, e.g. to all schools and to all Dutch teachers. A publication like **What curriculum would be offered in the new comprehensive junior secondary education**, talked about by Labordus, is primarily meant for the national authorities or better, the Minister of Education and Sciences. On the one side this publication has a function in the establishment of by-laws, on the other hand it is meant for all schools and in principle for all teachers involved in the relevant type of education. Labordus' example refers to the (new) comprehensive junior secondary education which is still the phase of preparation and discussion. The SLO-project **Nature study for 12 to 16 years old pupils** however aims in the first instance at (teams of) teachers in nature study in the first phase of the regular secondary school system.

We may therefore assume that the SLO makes support documents of a different character for different groups. But before answering the central question of this chapter, I would like to comment on the methods used by the SLO in obtaining research data for their development activities.

2.2 The SLO and the curriculum research in The Netherlands

It is the policy of the SLO that they take into account c.q. use as much as possible any data derived from curriculum research and curriculum innovation. In a policy memorandum of the SLO called "Leerplanontwikkeling en de SLO" **(Curriculum development and the SLO (1979))** it is expressed clearly that the SLO should take into account among other things the experiences of evaluators of curricula, because they can through their activities steer or otherwise influence curriculum development (1978; 8). This is one of the principles for the activities of the SLO.

The Dutch situation demands however that the SLO itself does not carry out research work - not even into the effect of its own work. Educational research and therefore curriculum research and evaluation in the Netherlands belong to the responsibility of a different educational entity. The SLO is mainly an **institute for development**.

However, in order to be sure that the possibly required educational c.q. curricular research takes place "at the right time and in close connection with the development activities" ("Leerplanontwikkeling en de SLO", 1979; 80), the SLO has closely cooperated with another educational institution ever since the time they became operational, i.e. the Foundation for Educational Research (SVO). Administratively the SVO is responsible for "educational research" in the Netherlands. The institute itself does not carry out research work. The SVO could be compared with the Research Department of the NIE in Washington D.C.

The SLO and the SVO mainly collaborate in jointly subsidizing such projects which are involved in investigating questions related to curriculum development (SLO, 1984; 2).

The two institutes together make available 500,000.-- Dutch guilders annually for specific projects, that is to say projects which are in the interest of curriculum development. All research work within that framework is done by independant professional research institutes. The management of the project remains in the hands of the SVO.

Curriculum evaluation, i.e. evaluation research into SLO projects also takes place on another level. On the basis of a co-operation agreement between the SLO, the SVO and the CITO (CITO is the Dutch National Institute for Educational Measurement) it has been made possible, since recently, to carry out annual formative and summative evaluations of SLO projects or support documents developed by the SLO. CITO's contribution to this has been on curriculum evaluation with regard to assessing pupils' results. The SLO does not evaluate its own products and projects. This kind of research is delegated to the CITO or to independent research institutes, which work under the auspices and with subsidy of the SVO.

2.3 Impact: what does this term mean?

The point at issue in the five studies to be discussed in this paper, is to give an answer to two groups of questions. First, is the SLO product concerned used by those schools and those teachers for whom it was developed? If so, for what is it used and is it used in the way the authors of the document intended it to be used? The second group can be summarized in one question: which is the impact of the studied products? But what is meant by "impact"? There are various and different answers to this question.

a. The term "impact" is used in the Task Force of the OISE-impact-study to refer to "ana observable and/or measurable effect, both direct and indirect, on individuals or groups" (1980; 2). Because the "ultimate target of the OISE is the student in the classroom" the impact of the OISE should be determined by studying the pupils' results. By this conception, the impact-criterion would be founded on the answer to the question as to what extent the influence of OISE activities are objectively detectable with regard to the pupils' results.

b. In the **Final Report** (1981) of the "Impact and Take-Up Project" of the Schools Council in England, "**the criterion of impact** (...)" is considered to be the answer to the question "to what extent is the influence and impact of the Council detectable both within schools and at other levels within the educational system of England and Wales"? (1981; 11). According to the report, the Schools Council can achieve "influence and impact" "by several means". The report mentions four possibilities. First, "knowledge of, and use of SC projects alone can have an impact upon people's thinking about what is educationally possible". Second, "in so far as the publications issued by the Council have kept the eyes of the educational world upon the future horizons of education (...) they aim at an impact beyond classrooms and schools". Third, the Schools Council can achieve impact "via its responsibility to keep under review examinations in schools (...)". Fourth, "by virtue of (the) immersion (of the council) in the educational system, and (the) co-operation (of the Council) with the many individual elements of that system" (1981; 10-11).

c. The policy memorandum "Leerplanontwikkeling en de SLO" ("**Curriculum Development and the SLO**") (1979) says that the main task of the SLO is related to "**developing**", that is to say (translated) "to proceed consciously and systematically towards the formulation of planning decisions of such kind that their execution is considered feasible and fruitful" (SLO; 1979; 32). The central idea is for the SLO to offer **help** to those who develop planning documents. According to the same memorandum it is desirable that development activities are carried out by the same people who are to execute the planning decisions. The SLO in principle does

not make school specific curricula but merely supports and advises those who do the actual developing work.

This support now, can be rendered by several different means. The SLO is mainly involved in making available written information, which has been referred to as support documents. The afore mentioned memorandum says that a support document should be in support of the curriculum development work done by teachers (SLO, 1979; 39). This supporting function must be expressive in that the publication should contain possibilities, analyses, examples, concrete forms, ideas, field reports and alternatives (SLO 1979; 49). The memorandum continues (translated): "The text should always be so that the reader himself has to make his own revision of the material offered in the publication, before it is incorporated in the schools own curriculum. Third revision can be made in the form of analyzing, considering and choosing, adapting to the reader's own principles, adding on ideas, interpretation, revising and working out. So as to allow for revision. The support documents must have certain basic characteristics. These are called "form characteristics", as they have to do with the form aspect of the publications in a general sense and not with the concrete contents thereof". (SLO, 1979; 40).

The two principal form characteristics mentioned in the memorandum are **accessibility and practicality**. A SLO publication must be "easily accessible to the teachers who are to use them" and must raise sufficient confidence in the practical relevance and applicability of the suggestions, ideas, experiences and advice offered" (SLO, 1979; 41). Moreover the publication must express active respect for ideological and educational pluriformity, a very important aspect in the Netherlands.

From the above it may be deduced that the SLO hopes to carry out influence on the (direct) curriculum development activities in for example schools, but also - like the Schools Council - "on the general context within which educational opinion is formed, and educational choices are made" (Steadman a.o., 1981; 10). As regards the first part of the conlusion, the impact-criterion will be related to the answer to the question as to what extent a team of teachers can draw support from a SLO product for the development of their own school curriculum (or parts thereof) - e.g. does the publication offer practical and usable suggestions, ideas, experiences and recommendations?

d. Buurke and Lucassen (1985) advocate that a SLO product can be used in two different ways and they describe these two ways with Fullan (1978) as "specific use" and "diffused use". "Specific use" is applicable when teachers use a SLO support document in concrete situations, whereas one can speak of "diffused use" when a teacher reconsiders his view as regards one or more aspects after having read a SLO publication. In imitation of Hutjes and Cuisinier (1983), Buurke and Lucassen talk respectivily about the **instrumental and conceptual uses** (Buurke and Lucassen, 1985; 9). The impact-criterion is according to Buurke and Lucas

sen, founded on the answer to the question: "How are the publications used in the educational sector and to what extent do they influence the views of the "user"?" (1985; 10).

e. In imitation of the "Impact and Take-Up Project" of the Schools Council, I shall divide the question on utilization and impact into three questions. For the sake of completeness I shall add a fourth question. **First**, how well known is the SLO and its activities. We presuppose a certain knowledge of the SLO and of their activities to be necessary conditions to decide as to whether or not to apply a SLO product. This first question which is described as "the choice criterion" (Steadman, 1981; 13) in the **Final Report** (1981) of the Impact and Take-Up Project, I shall answer on the basis of the study into the periodical "Leerplanzaken" (Curriculum Affairs - an informative periodical) (2.5.2).

Second, the respondents are requested "to record whether they made **extensive use** of, **some use** of or claimed to be **influenced**" by the project and publication (Steadman a.o., 1981; 13). The **Final Report** speaks in this context of "**the use criterion**". We shall apply this criterion to the separate studies of the four support documents (2.5.3).

Third, the question about the impact of the four supporting publications studied. The **Final Report** speaks in this context of "**the impact criterion**" (Steadman a.o., 1981; 14). The impact is determined by asking the respondents what their judgement/opinion is as regards the influence of the SLO-publication in relation to the intended use thereof. Like the second, this third criterion will be applied to the separate studies of the four curricula (2.5.4).

I like to add a **fourth** criterion, which is based on the answer to the question as to what impression the users of the publications studied have about the SLO. The answers to this question are given in 2.5.5.

2.4 The impact-study of the SLO

2.4.1 SLO products which were studied for impact-measuring purposes

In the past ten years the SLO embarked more than 70 projects. Within the same period a large number of (evaluation-)studies were carried out for SLO projects*. Not all those studies however were aimed at a response to the four afore mentioned impact questions. In 1983 a number of studies with this dual question were carried out for the first time. The decision for this evaluation had been take by the Board of the SLO in December 1982, also on the basis of data from earlier research (Jozefzoon and Marshall, 1982).

* For a review of SLO projects and evaluations made for SLO see chapters 9 and 10.

Three SLO-products were studied as regards their use by and their impact on education. First, a support document for the development of a curriculum for music education in primary schools. This publication has been disseminated and implemented since 1980. Second, the publication "Modelonderwijsleerplan PABO" (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education). This publication has been disseminated and implemented since 1982. The third support document studied, aims at the development of a curriculum for Economics for a "stream" of the Junior Secondary Education school system, the MAVO. It has been disseminated and implemented since 1981.

Due to time, financial and economical reasons the study had to be limited to three publications. Furthermore, the study was to be completed within one year and the total cost including preparation and execution was not to surpass 135,000.-- Dutch guilders. A further decisive consideration was that this study was to be a "pilot-study". In 1982, when the Board took the decision, there was little experience available in the Netherlands with regard to this type of impact research. Also in other countries little had been done in this particular field (compare Jozefzoon and Marshall, 1982). For that reason the assignment became more of a feasibility study, which was also to design a future evaluation system with the objective to supply adequate and useful data.

The Task Force in charge of the (total) evaluation, did not carry out any empiric research itself. Its principal task was to make a) evaluation comments on the functioning of the SLO on the basis of the data from the study of the afore mentioned three SLO products and (possibly) other research carried out on behalf of the SLO and b) recommendations for the policy to be followed with regard to future SLO tasks. Compilation of data about the use and the impact of the three before mentioned SLO documents was carried out by the Institute for Applied Sociology (ITS) of the Catholic University of Nijmegen.

2.4.2 Two other studies which are also relevant for measuring the impact SLO publications

Apart from the research into the three mentioned support documents of the SLO, this presentation contains two further studies. The data derived from them are in my opinion valuable when it comes to drawing a conclusion with regard to the use and impact of SLO products. First, the investigation into the use and applicability of the **Structure for a School Specific Curriculum** as part of a package of information material published by SLO (1981), which was developed and disseminated by the SLO. The study was carried out in 1982 by RION. Second, the research work done in order to determine the use and impact of a periodical called "Leerplanzaken" (Curriculum Affairs - an informative periodical), issued by the Information Service of the SLO.

2.4.3 Background information of the SLO products studied*

Before presenting the results of the studies, I shall give a description of the background data of the products studied, so as to give an idea of method of development, structure, objective, function and target group of those products. I shall first explore the second study mentioned in 2.4.2, that is to say, the study on use and impact of the periodical "Leerplanzaken" (Curriculum Affairs - an informative periodical).

2.4.3.1 The periodical "Leerplanzaken" (Curriculum Affairs)

The Information Service of the SLO issued a periodical in the period from 1979 to 1984. This periodical "Leerplanzaken" (Curriculum Affairs - an informative periodical), was published twice a year and contained articles about curriculum development projects, as well as reviews of SLO publications. They were headed according to school types. This paper was distributed free of charge in all schools for primary and secondary education and was meant to be a medium for information about the SLO and its activities.

2.4.3.2 The publication "Muziek voor het begeleid basisonderwijs" (Music for primary education)

a. **What does the publication consist of?** The publication, of which the definitive version was completed in 1980, consists of four parts. In the first part, the set up, the previous history and the function of the publication are discussed. The second part gives an explanation about music and music lessons in primary education, paying attention among other things to the function of music, music pedagogic currents, study activities and intended study effects as well as the choice and planning of study and teaching activities. The third part contains a framework for the music lessons for primary education, in which a number of principles are formulated followed by a division into five subjects.

b. **Target and function of the publication.** In the publication the subjects to be considered for music lessons in primary schools are indicated. The

* The studies mentioned under 2.4.1 were extensively reported on in W.J. Buurke and P.J.J. Lucassen, *The impact of SLO model publications on Education. Three model publications investigated,* (translated) Nijmegen 1985. The study on "The Structure for a School Specific Curriculum" (2.4.2) was reported in a RION publication: M.P.C. van der Werf, *Study on use and applicability of "The Structure for a School Specific Curriculum" of the SLO,* Haren 1982 (translated). The last mentioned study in 2.4.2 was published as Bulletin nr. 1 of the Sub department of Curriculum Theory and Evaluation of the SLO in 1984: E.K. Marshall, An investigation of the periodical "Leerplanzaken" (Curriculum Affairs), Enschede, 1984 (here translated).

authors intend this publication to be a source of inspiration for the development of school specific curricula and education programmes. Therefore it should be used as a sort of framework in which the structure of music education is explained as well as a sort of book of ideas for those primary schools which (intend to) work out (a part of) their own curriculum for music education.

c. **Target group of the publication**. In the first instance the publication is meant for **teaching staff who guide school teams in the field of music** as well as for **external staff** who accompany music lessons in a primary school. The authors of the curriculum have the intention that the afore mentioned staff can derive help and support from this publication in order to come to a realization of music as a subject in their schools. The publication was **not** written for direct use in the classroom.

2.4.3.3 The publication "Modelonderwijsleerplan PABO" (Proposal for a core curriculum for the training of teachers in primary education)

a. **Of what does the publication consist?** This "Modelonderwijsleerplan PABO" (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education), further on labelled as MOLP was developed on behalf of the Minister of Education and Science. The request came to the SLO in the beginning of 1980 and demanded a framework for the development of a School Specific Curriculum for the newly established training institutes for teachers in primary education (PABO).

The MOLP was implemented as from January 1982. It consists of an A-part and a B-part. The A-part has six chapters. The first chapter gives a history of how the MOLP came into being, its functions, directions for use and the structure of the publication. The second chapter deals mainly with the identity of the training institute, the social and cultural bedding in of the identity, the identity and professional skill of the teacher in primary education. The third chapter is about the "didactics of teachers training". The contents of the professional training forms the subject of the fourth chapter. The fifth chapter gives a description of the internal organization of the new institute and the sixth deals with prior conditions of the PABO development.

In the course of 1982 the SLO was engaged in developing the various B-parts in which it is endeavoured to give a practical and detailed description of parts of the teachers training course which could play a role for the development of a school specific curriculum in workshops and/or departments. The B-parts relate among other things to separate specialities. Some B-parts were written by SLO external staff, the PABO teachers. In september 1984, 68 B-parts had already been issued.

b. **The publication's target and functions**. The major function is described as follows: it shall be a stimulating frame for the processes of developing a specific curriculum for teachers training institutes. Hence, institutes can find inspiration from this curriculum when developing their own curriculum.

c. **Target group**. The target group of the A-parts of the MOLP are all PABO teachers. The B-parts aim at committee members and workshops in the PABO institutes who are involved in workplan development for their own institute, as well as at individual teaching staff in other disciplines in PABO institutes engaged in innovation and development in their own speciality.

2.4.3.4 The publication "Economie MAVO" (Economics for lower general secondary education)

a. **Of what does this publication consist?** In the spring of 1978 the Minister of Education and Science assigned to the SLO the task to develop a new curriculum for economics within the period 1978-1984. According to the assignment this curriculum should be "tested on feasibility and desirability (...)". The SLO project group chose an "open" working method to realize the assignment, meaning that the project group was going to work together with more than 400 teachers who all contributed to the development of the curriculum for economics.

In 1981, the SLO submitted to the Minister an Interim proposal, for a curriculum including a final examination programme for Economics MAVO. In 1982 the Minister decided to accept and implement a modified proposal as from the school year 1984-1985 as official examination programme. In consequence, Economics was taught during the school year 1982-1983 in all MAVO schools according to the SLO proposal. The curriculum proposal (the so called "blue books") consists of six parts.

b. **What is the objective of the curriculum proposal?** The support document in the form of a curriculum proposal explains that four major objectives will be pursued by teaching economics in MAVO schools:

a. the pupil must be made aware of the economic life in his country and (if necessary and possible) in other countries;
b. the pupil must be made conscious of his position in this economic society;
c. the pupil must acquire the practical knowledge and skill required for his economic activities;
d. the pupil must be able to independently determine his (motivated) viewpoint about contemporary economic problems.

These objectives were taken from the 1978 experimental examination programme. The authors add that in economic lessons, due attention

should be paid to the environmental and experimental world of the pupil. Keeping that in mind, the authors when developing the publication started from an interaction model considered desirable. The objectives are seen as a further (economic) elaboration of general situations, in which the pupil may find himself and with which he must learn to cope better.

c. **Functions of the proposal.** The curriculum proposal is supposed to complete the following functions to the user: it offers possibilities for reflection and taking one's stand with regard to Economics in the MAVO. It also serves to clarify laws. A further function is, to prepare for changes and transfer of knowledge. The two latter functions are the core of the proposal and apply specifically to two aspects thereof, namely to link the contents of the subject of economics with the experiences of MAVO pupils and to change working methods used in classroom situations.

d. **Target group of the curriculum proposal.** The curriculum proposal and the inherent final examination programme are in the first instance intended to be an advice to the Minister of Education and Science. In the second instance they are made for teachers in economics in MAVO schools. The experimentally developed study books were later taken over and published by an educational editor and are first of all prepared for teachers.

2.4.3.5 The structure of a school specific curriculum for primary education

a. **Of what parts does the Information Parcel consist.** "The Structure for a School Specific Curriculum" was developed by the SLO. As a support document it is a component of a package of information material pertaining to school specific curricula. A first edition was published in 1979. On the basis of comments received it was revised and re-edited in 1981. It consists of seven parts:
Part A: Introduction
Part B: General Information
Part C: Literature references
Part D: Scheme of stages
Part E: Structure of a School Specific Curriculum
Part F: Questionnaire
Part G: Review and summary of Schedules.

b. **Target group and function of the Information Parcel as a whole.** The Information Parcel and thus the **Structure of a School Specific Curriculum** aim especially at schools which were at the time already (experimentally) basic schools, or were working towards that purpose. "Basisscholen" (Elementary schools) (translated) is the name of a recently intro-

duced type of primary education (1985). They were also suitable for infant and ordinary schools in the old primary school system. In the future they will be adapted also to some kinds of special education. It is the intention to supply such schools with information about everything connected with working out a school specific curriculum.

2.4.4 The strategy of the studies

The ultimate target of the work of the SLO is the improvement c.q. the increment of the quality of education. This will appear from better and higher results achieved by the pupil. This means that "the ultimate target" of the SLO, like that of the OISE and the Schools Council in England, is "the student in the classroom". The SLO tries to achieve this effect indirectly by improving the planning qualities of the teaching staff. In chapter four we shall explain why the research does not involve the pupils.

The target group consists mainly of teachers. The studies mentioned in 2.4.1 and the first study mentioned in 2.4.2 were carried out mainly through interviews and "postal questionnaires". The researchers of the studies mentioned in 2.4.1 motivate their choice of these two methods as follows: "the first method has the advantage that a larger group of respondents is reached, who however cannot be interviewed as extensively as in the case of a personal interview. The second method offers the possibility of discussing some aspects more closely, but the group of respondents is smaller. A combination of the two methods offers the possibility to make use of the advantages of both the methods as much as possible. The advantage of these two methods of collecting data is that they can be completed within a relatively short period of time and with less cost" (Buurke and Lucassen, 1985: 13)*.
The second study mentioned in 2.4.2 was carried out by means of telephonic interviews on the basis of some 25 mainly precoded questions.

2.4.4.1 The samples

Dependent on the group for which the product is developed, "samples" were taken from the elementary schools, from the secondary school system (lower grades) and from teachers training institutes. The second study mentioned in 2.4.2 refers to all school types and educational levels (with the exception of Higher Professional Training). Random selections

* The board of the SLO decided that the research was to be completed within one year. The cost of the three studies mentioned in 2.4.1 were not to surpass 125,000.-- Dutch guilders. In this paper I can only give a summary of the findings as they are given in those reports, in view of the purpose of this symposium. For an extensive report please see the investigation reports (2.4.3*).

were made, except for the first study mentioned in 2.4.1, which was set up as a population study.

a. A random selection of 769 schools was made from a population that included all schools in the primary and secondary school systems. This sample pertained to the investigation of the periodical "**Leerplanzaken**" (Curriculum Affairs), that is to say the study on familiarity with the SLO and its activities.

b. Questionnaires were sent out to 452 schools to investigate the use and impact of the publication **Music for primary education**. 287 schools (63,5%) completed and returned the questionnaires. The researchers point out that this datum was influenced negatively by taking the order forms of the publication as a basis for the choice of respondents. A number of questionnaires, as it is said in the report, was returned with comments like: to order the publication does not mean it is used. This meant that the questionnaire was either completed well or only partly. Some of the questionnaires which were returned had not been completed at all, for different reasons like lack of time, no need, too much research, ethically not justifiable, illness, not applicable, publication unknown, publication not yet used. Most of the questionnaires which were half completed were returned with an explanation why. These amounted to 30 out of 152. More than 60 respondents who did not complete or only did so partially, said they were in the possession of the curriculum.

c. With regard to the research into the publication about the curriculum for training of teachers for primary education, the **Modelonderwijsleerplan PABO** (MOLP), questionnaires were sent to 50 out of 67 existing PABO's, i.e. a sample of approximately 75%. In selecting the 50 PABO's, consideration was given to distribution by region and denomination. The questionnaire consisted of 4 parts, gathering data about the institute, working method with regard to the institute's own curricula development, distribution and use of the MOLP and general impression of the SLO. A total of 32 questionnaires were returned of which 31 could be processed. This resulted in a respons of 62% of the total number of PABO's approached. The researchers made the following comment with regard to the percentage: "Our principle was - in conformity with the application for subsidy - that approximately half of all institutes were to be engaged in the research. The result of 31 completed questionnaires means that this target has been achieved by approximation (31 out of 67)".

From the returned and completed questionnaires three institutes were selected on the basis of the data supplied, for a more qualitative type of research, consisting of individual interviews with executives and group interviews with 2 to 3 teachers of the three PABO's. In selecting the three institutes regional distribution and denomination were taken into

consideration. The choice of the teachers for the interviews was left to the executives of an Institute. The researchers however gave two conditions: 1) the teachers should be of two different disciplines and 2) they had to be involved in the development of the Institute's own curriculum.

d. For the study of use and influence of the curriculum proposal "**Economie MAVO**" (Economics for lower general secondary education), the data were compiled by means of a sample of 300 schools, i.e. 26% of the total population of 1135 MAVO-schools. In total 187 schools completed and returned the questionnaires, a response of 62,3%. According to the researchers, the majority of the no-response of 113 schools (37,7%) were schools which did not react at all (N = 90); 12 schools refused participation, 6 schools had moved, 2 schools did not complete the questionnaires due to illness of the teacher concerned and 3 schools had been closed. The questionnaires were completed by teachers with the highest number of teaching hours for economics.

e. The research into use and usableness of "**The Structure for a School Specific Curriculum**" as part of the **Information Parcel** pertaining to school specific curricula for primary education, was carried out by means of sample of 1971 infant and primary schools from all over the country. Of these schools only names and addresses were known and this made it impossible to stratify the sample on size or type of school.

In sampling, attention was paid to distribution over the country. 327 schools (= 16%) were served with questionnaires of which 49% were returned. Of those questionnaires the several parts were completed as follows: part A 35%, i.e. schools which use the Structure (N = 52); part B 31%, i.e. schools which had read the Structure and intend to use it (N = 48); part C 9%, i.e. schools which do not intend to use the Structure (N = 14); part D 25%, i.e. schools which had not yet read the Structure (N = 37). Nine questionnaires proved unsuitable for processing. The questionnaires for the no-response research were sent to 167 schools, of which 74 returned them (44%). The main reasons given by the schools for not completing the questionnaires are: no time 28% (N = 21), forgot 1% (N = 1), Structure not read 46% (N = 33) and Structure not used 24% (N = 17).

2.4.4.2 No observations

No observations in the classroom were made in any of the mentioned five studies. Not only because to carry out observations in micro-situations would have (strongly) increased the cost and time factor, but also because it was not known what precisely should be observed. I shall further discuss this item in chapter four.

2.5 The findings

2.5.1 Two introductory remarks

In this paragraph I shall summarize the major findings of the five studies. The summary is like that of the Task Force of the OISE-research, very concise and hardly giving any interpretations*. The data sources used here are discussed in detail in the research reports, named in 2.4.3*. I shall avoid, - like in the OISE study and that of the "Impact and Take-Up Project" - a (very) detailed report, which "would be self-defeating" (compare Steadman a.o., 1981; 17). I shall group the findings on the basis of the four criteria (see 2.3). The presentation here can be considered as "Highlights of Findings" - like in the OISE report - from the five research reports.

Like in the English study, it also applies here that "comparisons between and judgements of individual projects are very difficult" (Steadman a.o., 1981; 17). As it is apparent from 2.3, the projects "have different curricular aims, try to reach audiences which vary greatly in size and composition; have been funded and resourced to different extents; have been launched into different economic and educational climates; have had different lengths of time in which to become established; and have received different levels of (...) support" (Steadman a.o., 1981; 17).
Also the developing strategies followed are different.

2.5.2 The Choice Criterion

Support documents made by the SLO are not forced on the teachers. Schools and teaching staff can choose themselves for a SLO publication. In order to be able to make that choice, the school or the teacher should be familair with the SLO and its work. Moreover, so as to be able to choose to make use of a certain publication or not, one must be acquainted with that publication. Or to quote Salter and others (1980): one should have "contact" with the publication in question. "Contact" means that the teachers had read part of the materials or considered themselves well acquainted with the project (in our case: the publication (EOIJ)); that is, they were in the position to make a choice" (Salter a.o., 1980; 5-6). "The choice criterion" can thus be considered to be applied on two levels: a general level and a specific level. On the general level the SLO as a whole is concerned - acquaintance with the institute and its activities. On a specific level, the familiarity with an individual SLO publication is concerned.

* Compare Report of the OISE Task Force ....., 1980; 6.

2.5.2.1 Familiarity with the SLO and its activities

Within the framework of the research into the functioning of the periodical "**Leerplanzaken**" (Curriculum Affairs - an informative periodical), two questions were included with regard to familiarity with the SLO and its activities.

a. The first question: "Did you hear of the SLO before?" The question was answered positively by 731 (= 95,4%) of the respondents of a random sample of 769 schools for primary and secondary education; 35 respondents (= 4,6%) gave a negative answer. A division of the scores according to background variables, school size, denomination, situation and type, shows that there is no connection between the variable "familiarity with the SLO" and the background variables. There is only a statistical (significant) connection between the background variable "school type" and the variable "familiarity with the name". It is apparent that the name SLO is least known in infant education (89,1%) and best known in the so called elementary schools for primary education and the schools for some branches of vocational secondary education (MBO) - both 100%.

b. The second question put to the respondents: "Do you know what the SLO is doing?", was answered positively by 549 (73,3%) of the respondents. They were even able to name correct examples; 98 (= 13,1%) also responded positively but did not appear to know what SLO does. 102 (= 13,6%) answered negatively. A large majority of the respondents (73,3%) appeared to know about the activities of the SLO. It should be added however, that the answers given were usually rather vague, like: "they develop curricula for schools" and just one or more (national) projects could be named. The false answers, as is said in the report, refer to the fact that the respondent thought that the SLO also guides individual schools. It is true that guidance/co-operation exists within the framework of curriculum development **projects**, so that may have led to the conclusion that guidance is a regular task of the SLO.

A statistically significant connection was found between the variables "school type" and "familiarity with the activities of the SLO". The report shows that the respondents from schools for infant education, for general secondary education (MAVO/HAVO/VWO*) and for schools for special education are less familiar with the activities of the SLO than those of other school types.

* For abbreviations see chapter 7.

2.5.2.2 The four investigated support documents

a. **Muziek voor het begeleid basisonderwijs (Music for primary education).** Until the end of 1983, five editions were made of this publication. The total circulation amounts to 4903 copies, of which 16,4% (803) are sold to infant and primary schools, 5,9% (289) to music training schools, 16,5% (808) to teachers training institutes for primary education, 13,2% (648) to concultants for music schools and school inspectors, 24,5% (1203) to others. The 803 copies were sold to 452 infant and primary schools. 79,9% of the respondents in this study (N = 287) said they were familiar with other publications and acitivities besides the one on music.

b. **Modelonderwijsleerplan PABO (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education).** "All institutes connected with the PABO development", according to the research report, "were served with one or more copies of the A-part of the MOLP". Of the 68 B-parts 20.000 copies were sold. Almost all singlesubject teachers and others involved in PABO's are in possession of one or more copies of the B-parts. Of the 31 responding PABO's, 27 answered the question about acquaintance with the SLO and its activities. 22 (81%) say they are familiar with other publications or activities of the MOLP.

c. **The Curriculum Proposal Economie MAVO (Economics for lower general secondary education).** All 1135 MAVO schools have the proposal in their possession. It was officially sent to them by the Ministry of Education and Sciences, as it had been declared official curriculum/examination programme for Economics/commercial arithmetic in MAVO schools. 25% of the respondents were familiar with one or more publications or activities of the SLO. 75% says they are not familiar with them.

d. **The Structure for a School Specific Curriculum.** Of over 8000 infant and primary schools, 24,6% (N = 1971) have applied for the second supply of Information materials for 1981, thus for **The Structure for a School Specific Curriculum**. The research was aimed at this target group.

2.5.3 The Use criterion

The important factor for this criterion is whether the chosen publication is really being used and if, to which purpose. In other words, to choose a certain publication does not necessarily mean that it is or will be used (Salter a.o., 1980; 6). A third question is, assuming that the publication is used, whether that utilzation is in accordance with the intention of the authors. Like for the Schools Council it applies to the SLO, that "it is no part of the Council's (read: the SLO's) job to ensure that project materials (read: publications) are used in schools" (Salter a.o., 1980; 6). "In fact,

there are several reasons to support that the criterion of project use is relevant in assessing the work of the Council (read: the SLO)". They name three reasons: "Firstly, if the credibility of the Council as a supplier of choices for teachers is to be maintained, then some use of its products is essential ... A degree of take-up is essential if the Council is to maintain its position in the educational market place: this is an objective requirement of the Council's continued existence. Secondly, it is part of the Council's formal and informal rhetoric that it responds to teacher need; that it is sensitive to the demands of the teacher market. That being the case, it is justifiable to apply the criterion of project use in assessing the results of the Council's efforts ...; if the Council is responding to their needs (i.e. the needs of teachers, EOIJ) than they will be making at least some use of the materials produced for their benefit. Thirdly, it is politically unrealistic to believe that as a recipient of public funds the Schools Council is not in some general sense accountable in terms of the practical effect it has on schools" (1981; 6). I shall now apply "the use criterion" to the four support documents of the SLO. What do the research findings tell us?

a. **The publication Muziek voor het begeleid basisonderwijs (Music for primary education)** is mainly used by teams of teachers involved in the development of school specific curricula (31%) and whole school teams (30%)*. It also used by individual teachers (11%) and by external staff (18%).

• 81% of the respondents say, the main reason they buy a publication is that "we wanted to develop a school specific curriculum for music". A second reason (58%) reads: "we were not satisfied with the method of teaching music in the school". The expectation of the majority of the respondents therefore is, that the SLO document could (possibly) help to solve the problems of music teaching in the school. Those problems most probably have to do with making a school specific curriculum for music.

• The question as to what purpose the publication was used was answered by 82% of the respondents as follows: "to gain ideas for drafting a school specific curriculum for music". The second answer (52,5%) reads: "we wish to change the framework of music education at school with the help of the book".

• The researchers concluded, that the majority of the schools use the publication as a **sourse of inspiration** in developing a school specific curriculum for music. This corresponds with the main intention of the publication: the authors indicate which subjects should be considered within music education in primary schools, so that these can serve as a source of inspiration for the development of school specific curricula and educational information materials. According to the authors the publication

should be used as a sort of framework in which the structure of music teaching is globally indicated and as a sort of instruction book for primary schools, which, with help of external guidance, intend to work out a school specific curriculum for music (Buurke and Lucassen, 1985; 21).

b. **Modelonderwijsleerplan PABO (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education).** I remind you of the fact, that of a population of 67 PABO's a sample was made of 50 schools, that is nearly 75% of the total population. Of the 50 schools 31 responded (= 62%). The research report shows that not all parts are used in the same way with the same intensity - the usage differs from chapter to chapter. It appears, that chapter five is less used (32%) and chapter four is used most (55%). The percentages for use of chapters 2 and 3 are 45 and 52 respectively.

- Chapter four of the publication is mainly used by teachers for their own subject. Chapter two is used by all concerned. Chapters 3 and 5 are principally used by commisions/work groups in charge of the development of a curriculum for their own institutes.

- The A-part of the publication is not used as an instruction for the development of a curriculum for the institute, but to get ideas about certain topics. The use of Part A of the publication is thus partly in conformity with the authors' intentions. The publication does not have a function as a "stimulating framework", but rather that of "Supply ideas for ...".

c. **The Curriculum Proposal Economie MAVO (Economics for lower general secondary education).** For the purpose of this study a random sample was made of 300 schools out of a total population of 1135 schools, that is 26% of the total population, 62,3% (N = 187) responded. Almost 40% of all economics teachers at MAVO schools used he SLO materials of the Economics MAVO project in one or more classes.

- 20% of the respondents gave as reason for choosing the SLO materials, that they had contributed to the realization thereof; 12% said that with those materials they were able to work more as a "tutor" rather than a "teacher".

d. **The Structure for a School Specific Curriculum.** This research was carried out by means of a random selection of 327 schools out of a number of 1971 schools. The sample thus is 15% of the total number. 49% responded. 35% of the responding schools uses the Structure; 31% read and intended to use it. From the research report it becomes apparent that the large majority adopts both the chapter and the paragraph division of the proposed structure, i.e. 65%. None of the schools uses the proposal exactly in the way it is presented. Despite the fact that in this support

document the SLO stipulates that a school specific curriculum is not meant to be a scheme for planned change, it appears that 17% of the respondents indicate what changes are to be induced and how. 35% describes effectuated changes and 37% describes the existing satisfactory situation. The 12% indicating a combination of the two, mostly describes a combination of already established and desired alterations.

• Just over half of the schools use a structure based on school subjects (56%). 15% uses a thematic structure, 23% a semi-thematic, semi cursory structure and 6% uses a structure in which only the instrumental subjects are cursorily arranged.

• 39% use the school specific curriculum in accordance with the function which the support document ascribes to it; 51% only do so partially; 10% adopts two functions, 41% only one. The 41% mostly mentioned the practice function for the practical part. 10% of the schools adopts none of these functions. More than half thinks the Structure is too detailed and did not go on to details. 16% followed the Structure as prescribed. 22% did more than was prescribed in the details and 8% went far beyond the details.

• The answer to the question as to which part of the school specific curriculum one should begin when starting to describe the curriculum, is as follows: just over half (51%) start with the General part; 4% starts with the Specific part and 10% with the practical part. 35% start with several parts, mainly the General and Practical part simultaneously.

2.5.4 The Impact Criterion

As regards this criteriom the judgements of the users of SLO publications is important. Which judgement is passed on a publication? - is it regarded usable? Did something happen to the user following usage of the publication? And: did the publication have any influence? Let me answer these questions on the basis of the research findings.

a. 48% of the respondents of the research into use and influence of the publication **Muziek voor het begeleid basisonderwijs (Music for primary education)** think, that the effect of the elaboration of the five parts is the most important; 58% think the structure of the book is important; 57% thinks the proposal for a minimum-offer is important and 51% thinks the division in 5 parts is important.

• A number of central notions on which the curriculum music education for primary education is based, as is said by the report, seem to have penetrated into the minds of the teachers at infant and primary school level,

who contributed to this research. A large number of respondents of both guided and non-guided schools (the latter to a minor extent) became convinced after taking notice of the publication, of the correctness of a number of the principles mentioned in the publication, or agree with the principles and assumptions mentioned in the publication, as was quoted in the report.

• The report also shows, that one third to half of the respondents pays more attention to methods by which pupils learn to work more independently, and that their way of teaching is more determined by their ideas and initiatives since they took notice of the publication. These methods are specified in the publication. Furthermore, teachers make more use of aids like musical instruments and audio-visual means for their teaching of music.

• Over 30% of the respondents judge positively about the objectives of the publication, since they became familiar with it. 60 to 79% says it makes no differences.

• 85% of the respondents think that the publication offers sufficient possibilities for improving music education; 75% says that through the method that is advocated in the publication the pupils gradually gain more insight into the function of music; 63% judges that the SLO have a positive influence on innovation of music education.

b. Modelonderwijsleerplan PABO (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education). A very large majority of the respondents (70 to 97%) involved in the research into use and impact on the MOLP judge, that the five goals of the MOLP are (very) useful. Exempting the fourth target, 61 to 71% think that the goals have been realized (very) well. It is remarkable that 70% consider the fourth goal (very) useful, but only 39% think it has been realized well.

• "More than one third of the PABO's thinks that the MOLP has had a great influence on the development of the Institute's own curriculum. It appears however, that the respondents judge the various parts of the MOLP completely differently. The second chapter has had most impact, according to 47% of the respondents, followed by the third chapter (43%). The influence of chapter 2 and 5 are rated highest by 33% of the respondents.

• 7% of the PABO's think that the MOLP has stimulated the development of the Institute's curriculum to a very large extent; 48% speak of "to a large extent".

• Three quarters (74%) of the 27 PABO's think that the SLO has a posi-

tive influence on the innovation process: 1 PABO (4%) is clearly negative in its judgement and 6 (22%) are neither positive nor negative. Also in other points there is satisfaction about the role that was played by the SLO. The MOLP offers enough scope for a contribution to the training courses (89%) of the PABO's; it stimulates opinion forming and discussions among teachers (78%) and a large group think the MOLP concrete enough for the development of an Institute's specific curriculum (63%), although there is some doubt about the latter as far as the courses are concerned.

c. Of the respondents using **the curriculum proposal Economie MAVO (Economics for lower general secondary education)**, i.e. 40% of all economics teachers in MAVO schools, 80% think that the proposal links up well with the principles of the curriculum for economics.

- Approximately 80% of the respondents using the materials, thinks that these materials correspond well with the pupil's interest and dayly life.

- Approximately 25% of the respondents admits that since reading the materials, they began to think more positively about the objectives of the subject of Economics. The opinion has remained unchanged for the majority.

- Many teachers say they changed their way of teaching after reading the SLO materials Economics-MAVO. The now have more class discussions and see the importance of the pupils own contribution to the lesson as well for independant working which is now more frequent.

- Approximately 82% of the interviewed teachers are of the opinion that the SLO has had a positive influence on the innovation of the subject commercial arithmetic. 66% think that the curriculum stimulates opinion forming among pupils and that it offers enough scope for a contribution on the part of the pupil.

d. **Structure for a School Specific Curriculum**. Of those schools that use the Structure, (35% of the response), 25% think it usable, 43% think it reasonably usable and 8% moderately usable. None of the schools thinks it is unusable. A more detailed investigation shows a more positive judgement:

- 59%: the Structure is usable for describing factual data and the pedagogic-didactic view;
- 26%: the Structure is usable for describing realized changes;
- 35%: the Structure is usable for the organization of the subject areas;
- 64%: the three-division in the Structure is usable;
- 52%: the Structure is usable for specifying functions to various parts;
- 42%: the extent of detailing is usable.

• The schools which use the Structure, interprete the data presented above, as being directive or inspiring, as objections against the Structure. These objections could be interpreted as lack of support. This interpretation is enforced by the objections mentioned against certain parts of the Structure: it contains few concrete directives for describing facts and the pedagogic-didactic view (23%). 24% think that the Structure contains few specific directives; the Structure is too detailed, hence it takes too much time to explain everything (20%), whereas one could also refer to many items (14%); lacking is important information (20% about coordination of subjects; 25% about diagnosing and remedies; 18% about longitudinal subject-matter planning; 19% about the formulation of targets; only 30% of all the schools thinks the Structure lacks important information). For extensive data we refer to tables 26 to 43, page 22-26 of the report.

• Of those schools which use the Structure, 17% say that they only take ideas from it, 17% also use the chapter division and 65% use both chapter and paragraph division. None of the schools adopt the Structure as it is presented (see table 17, page 15).

• Of the schools which had objections to the Structure in general (61%), 6% considered the Structure usable only as a source of ideas, 27% only as a guide for making its own structure and 17% only usable when additions are made to it (table 36, page 22). Summarizing one can conclude that 49% of the schools using the Structure, factually use it as a directive, and consider it an inspiring document for the development of their own School Curriculum.

2.5.5 The Criterion of Image

With this criteriom we mean the image the user has created for himself by using the publication*.

a. From the research into the publication of the PABO it is apparent that most PABO's have a positive opinion of the SLO's objectives. ''Usableness of the publication for the educational system and respect for the school's freedom, rate among the highest opinions. More than 85% of the interviewed PABO's considers the SLO publications useful for the educational system. 75% of the PABO's thinks that the SLO had a positive influence on the innovation proces and 89% of the PABO teachers says that the SLO left enough space for field contributions''.

* The research into the use and applicability of the Structure of the School Workplan does not contain relevant information on this item.

• The research report reads: "Quite a number of PABO's indicate, that their opninion about the SLO has changed since they first read the MOLP. Over half of the PABO's (58%) changed their opinion; of this group 13 (50%) changed positively and 2 (8%) negatively. Those whose opinion changed positively remarked that the SLO gains in esteem now that they are dealing with them in a concrete situation. It is observed that the SLO is more closely related to the educational problems than was generally thought. Some did not change opinion, or did so in a negative sense on the contrary remark, that in their view the MOLP does not link up sufficiently with the situation at the schools. Moreover it was observed that the material is too much.

• The image one has of the SLO, is obviously connected with the opinion about the publication. Those who judge the publication positively, now have a more concrete, often positive impression of the SLO as an institution within the educational structure. It is not clear in how far themselves do not consider these two factors together."

b. 74% of the responding teachers in the research into use and influence of the curriculum proposal Economics in MAVO's thinks that the SLO produces practicable support documents. Least positively is thought about the extent to which the SLO take into account the identity and ideological pluriformity of the educational system; 25% and 29% respectively of the teachers think that the SLO takes this item seriously into account.

c. With regard to the curriculum "**Music for primary education**" the picture looks as follows. More than 85% of the interviewed teachers thinks that the SLO developes useful publications for the educational system and that the SLO respects the educational pluriformity. The research report shows that teachers are in general content with the activities of the SLO.

2.6 General Comments

From the "Highlights of Findings" in 2.5 it may be concluded that the SLO scores rather highly with their four support documents as far as the four criteria applied are concerned. The educational field is reasonably well acquainted with the activities of the SLO and the institute itself. The opinion about usableness and influence of the SLO publications studied is positive to very positive. Nevertheless, one should be careful not to draw extreme conclusions as regards the work of the SLO as a whole on the basis of the research findings here presented. It should be remembered that the publications to be studied were selected partly on the basis of the degree of satisfaction they had scored within the SLO itself. A

positive result of the studies was therefore to be expected.

But caution should be taken for still another reason. The reports on the research which was carried out by the ITS make mention of especially the gaps in information and justification in relation to the selection procedure. The following points for example, were not clarified:

- why were, for the research into the publication "Music" those teachers selected who were most acquainted with the publication, why for "economics" those who had the highest number of teaching hours and in the PABO those persons who were closest involved in the development of the institute's curriculum;
- how were the 452 infant and primary schools selected among the 803 which had been served with the relevant publication;
- how were the 21 external guides c.q. "a number of schools" selected, as mentioned on page 30 of the final report;
- how were the 50 PABO's selected among the total 67 and the 3 PABO's among the 31 respondents.

A third reason for caution in drawing more general conclusions from the research findings presented here, is that except for the RION research, hardly any research into the no-response was carried out. The representation of the responding groups for their respective samples is therefore difficult to judge (music: 67%, economics: 38%, PABO 38% no-response).

Finally this: in 2.5.1 I pointed out that "comparisons between and judgements of individual projects are very difficult". Not only because the publications differ in "subject-matter", intentions and demarcation, but also because of diversity of the various target groups. All these factors together make it a tricky affair to draw general conclusions.

According to Stokking in the already mentioned (internal) note, it is however unlikely that the observed methodological gaps are detrimental to the qualitative conclusions from the studies of the publications "**Music for primary education**", the **Modelonderwijsleerplan PABO (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education)** and the **Curriculum Proposal Economics MAVO**. The picture as a whole is therefore probably correct. It may at the most be too rosy as far a number of people is concerned in the various sectors, who are familiar with and have an idea of the SLO products and the SLO as an institute. But that had been, as was said before, included in the selection of the publications concerned. The SLO had to be reasonably satisfied with them. Stokking continues by saying that as a general impact evaluation limited value should be attached to the present research findings. They do not mean anything as far a the total collection of SLO products is

* The text of this paragraph is mainly a representation of a combination of the two notes by K. Stokking and W.J. Buurke respectively. The notes were written on request from and on behalf of the sub department for Curriculum Theory and Evaluation of the SLO. I wish to express my thanks to both gentlemen for their notes.

concerned. The chance however, that most unselected, c.q. not responding schools and/or teachers would be negative about the SLO and it products, is however rather small. In any case, such does not appear from the, however limited, no-response research. From this point of view, it is absolutely correct to consult with only those people who have had contact with the SLO and SLO publications, when carrying out an impact research.

3. The ITS-research closely studied

3.1 The publication "Muziek voor het begeleid basisonderwijs" (Music for primary education)

As had been said before, this research was a population research. The target groups were all schools, assumably in possession of the relevant publication. This assumption was based on administrative data of the relevant SLO orderforms. The orderforms were counted by a member of the ITS staff and resulted into a mailing list of 452 infant and primary schools, which had ordered one or more copies of the curriculum. The total consisted thus of 452 schools.

The basis for the respondent register however proved to have weak spots during the two months of fieldwork. Of the 452 questionnaires mailed out, only 287 were returned, i.e. 63,5% of the total number. From experiences gathered from recent written surveys among primary education, it may be assumed, as the researchers say in answer to a question about the significance of these percentages, that a percentage of 50 is considered reasonable . This figure is considerably lower than what was considered "normal in the past (70 to 80%). About the decrease in positive response to written surveys exist several theories according to the ITS researchers:

1. the pressure on mainly primary education as a consequence of budget restrictions;
2. the growing aversion to research institutes which are considered to be an extension of the national authorities;
3. the frequency with which primary schools are aprroached to participate in research has led to a certain "research weariness".

In practice this means that, in order to obtain enough response, safety margens are applied in sampling like e.g. increasing the size of the sample to a larger number than really required. This however does not apply to population research.

In the present study, the percentage of processed questionnaires is even lower, namely 33%. The explanation given in the final report, refers to the weak basis of the respondents list, that is the list of orderforms of the SLO. Apart from the disputable list of addresses, some of the schools which returned the questionnaires uncompleted, wrote that they

had ordered the publication recently or that they had not yet read it or used it in their programme. From an additional study of the motives for negative response, that is to say of schools which returned the questionnaire un - or fragmentary completed, it appears that the respondents concerned did not forward exclusively negative arguments with regard to the publication to justify why they did not complete the questionnaire.

No further investigation however was carried out among those schools which never even returned the questionnaire. In some cases response cards are mailed to find out the motives of potential respondents for not participating in a research. A no-response study is important for establishing whether those who did not respond deviate systematically from those who did, with regard to certain characteristics. Such studies could supply valuable information about the research object to be considered for the formulation of the final conclusions.

From the data about the schools which returned the questionnaire either uncompleted or fragmentary completed, it appears that the schools had had the publication for too short a time to be able to do anything with them. Other schools used the publication in some or the other way (like a reference guide, as a controle or their own ideas, etc.). So, over 60% of the total population (N = 452) of guided primary schools which had a publication, returned the questionnaire. Anout a part of them, information remained limited, whereas an extensive report could be made about the rest (33,6%).

On the basis of the research findings, the researchers assume that they reported on those schools which were highly capable of giving an opinion on the impact of the publication **Muziek voor het begeleid basisonderwijs (Music for primary education)**. Because, the majority of them had not only read the publication, they had also used it in practice. To enquire about the usableness of a SLO support document is only then practical, when the respondent is familiar with it and had used it in some form or the other in practice. The schools which did not react to the request to participate, continue to be an unknown factor, since the motives for not doing so, are unknown.

3.2 "Modelonderwijsleerplan PABO" (Label: MOLP) (Proposal for a curriculum for the training of teachers in primary education)

To carry out this study, a sample was made of the total number of schools registered. On the basis of a mailing list of 67 PABO's, compiled by the Ministry of Education and Science and improved by the researchers, 50 training institutes were selected to participate. Criteria for the selection of those 50 institutes were that they had to be spread about the country and that they had to be of different denominations. Of the 50 questionnaires which were mailed, 31 proved to be complete for processing, i.e. a response of 62%. That means that more or less half of the

institutes was engaged in the research. This number is in accordance with the guarantee given in the application for subsidy, that about half of the total number of PABO's would be approached. An indication as to whether the sample c.q. the responding institutes, is representative is obtained from spreading the institutes over a number of background characteristics, like denomination, place of establisment, situation with regard to the fusion problem, number of students and so on.

The spreading is rather extensive. After having compared the background data with those on the mailing list, the researchers found that the sample could be considered representative (checked on denomination, place of establishment and size). This fact together with the response of nearly 59% of the total number of training institutes in the Netherlands, gave the researchers enough reason to assume that the generalization value of the research data is rather high for this particular research.

3.3 Curriculum Proposal Economics MAVO

For this research use was made of the up-to-date CBS mailing list of MAVO schools and CBS departments at the disposal of the ITS. The researchers worked with a disproportional sample. Three groups of schools relevant for the research were distinguished: schools participating in the SLO project Economics: schools participating in the MAVO project and schools which were not involved in either two projects. Among these groups 3 samples were made by computor of 50, 100 and 150 respondents respectivily (in total 300 of 1135). In the end 187 schools participated, over 62% of the schools approached following the three samples. Considering the experiences with written surveys, the response percentage of 62 cannot really be considered low. The response was badly distributed, that is to say that the percentage of SLO project schools was a little higher (76%) than that of other schools (8%). In order to avoid distortion of the research results, the findings were given weight factors, so that the proportion figures between the groups was approximated.

3.4 Three final remarks

a. As far the first study mentioned under 3.2.1 is concerned, it should be observed that the final response percentage is rather low (33,6%). Furthermore the research cannot provide any information about the schools which did not participate in the research, because no analysis was made of the reason why. The representative value of the analyzation materials should be considered with some reserve as far as this research is concerned. It should however be taken into account that the publication **Muziek voor het begeleid basisonderwijs (Music for primary education)** was not in the first instance meant for direct use by teachers but for those

belonging to the field of educational provisions.

b. As far as the other studies are concerned, there are sufficient indications to justify the conclusion, that the samples are representative. As for the study Economics' MAVO, it must be observed, that there is some distortion, considering the found selectivity of the drop-out. In view however of the extent of selectivity, the effect thereof on the research findings is negligible.

c. What do these conclusions mean with regard to the generalisation value of these studies? Generalisation of the research findings in relation to the schools is in our opinion acceptable on the basis of the statements in 3.2, although with some reserve as regards the first study. It has been endeavoured to obtain the widest possible spreading according to type of support document, type of education and target group of the publication, in selecting the research objects. This however does not mean that the publications are representative for others prepared by the SLO. I already explained this statement in 2.6. It is true though, that in the four studies as a total a general picture is drawn of the SLO as it exists in the minds of various groups of approached respondents and that this part may be accepted as being representative for the opinion about the SLO as it stands in the education sector. That judgement cannot be called negative!

4. Three factors hindering an adequate appraisal of the impact of a national institute for curriculum development

4.1 The appraisal of students' results in a study on the impact of a natioonal institute for curriculum development

The activities of a national institute for curriculum development aim at the last result, at contributing to the quality improvement of the educational system. That would have to appear from the behavior of teaching staff and pupils. As for the former, a better planned and executed way of teaching is concerned. This effect was studied in the three reported impact-studies (OISE, Schools Council and the SLO) through a registration of opinions of mainly teachers to questions on this point, The planning- and teaching behaviour on the basis of the documents concerned were not studied via direct observation.

As for the pupils, the principal issue is a higher study effect. In the up to now carried out studies, the research population consisted mainly of teachers, who are the intermedial ''clients''. No attention was paid to the pupils.

Neither were any tests done among students. The explanation given by the SLO is that the materials developed by the SLO are mainly for

(teams of) teachers and primarily intended for use in micro-situations by individual teachers. It is as probably known, very difficult to measure the effect on the study approach of pupils of a product developed for the planning approach of teaching staff. This can certainly not be done with the traditional means of questionnaire and interviews with teachers.

In the report of the Task Force of the OISE-impact-research the following is observed as regards the problem of the impact of publications of the OISE, i.e. more or less of a national institute for curriculum development: "It is unfortunate but unavoidable that we have been unable to obtain first-hand the final evidence of OISE impact - its effect on the student". The report continues" "To our knowledge, no study of the impact of educational research has so far been able to do **this**" (1980; 3). This observation of the Task Force still holds. To achieve that objective, large scale and long time observations in micro-situations (i.e. in the classroom) are required, whereby the interaction between teacher and pupil is observed and analyses are made of schedules and study results in relation to an adequate curriculum (for the SLO: support document for curriculum development).

Naturally such an approach consumes much time and finances and the question remains whether a board will take a positive decision for such a costly research - especially in a time of serious budget reductions. A principal argument is that - to speak in the words of the OISE Task Force - "Educational change, for many reasons, is a very slow and highly incremental process. Even with a wealth of resources and time, an attempt to asses the Institute's impact in the classroom could easily have been futile, given the difficulties of disentangling the subtle influences of research" (1981; 3). An assesment of the impact when no attention is paid to students effects, represents only a partial answer to the impact-question.

4.2 Isolation of the workable share of a national institute for curriculum development in the process of development and/or innovation of education

Gage, Husén and Singleton describe "educational change" as a "very slow and highly incremental process". This also applies for the effect of curriculum products of a national institute for curriculum development in the educational system, even as far as the class level.

This process needs time, much time. That time, that process, effects many people with different backgrounds and expectations. Most probably the disseminated product will undergo various changes during the implementation process. One should also consider that implementation of the products of the national curriculum development institutes "is no part of the job of these institutes". It is therefore not their task "to ensure that project materials are used in schools". I herewith wish to

point out that there is no direct relation between the quality of a curriculum product as it is developed by the national institute and the factual use of that product in schools.

A consequence of the long working period and the changes affecting this kind of innovation minded products, makes it a rather difficult affair to indicate which part of the ''changed educational situation'' is due to a disseminated and implemented curriculum publication.

4.3 The evaluation of a national institute for curriculum development takes place in the field of forces of power and interests groups

A national institute for curriculum development forms a part of the national educational policy. As such it is a part of national politics. Its means are a post on the government budget and are thus determined by the national parliament. This applies at least to the Dutch National Institute for Curriculum Development and the former Schools Council. In Ontario the budget of the OISE is part of that of the provincial authorities. Only because of this a national institute for curriculum development is straight away a political institute. It is subject of political (and so public) deliberation.

As a consequence even decisions concerning the continuation of such institutes may be taken over their heads. An example is Robert Nixon's ''first budget as Treasurer of the Ontario Liberal Government'' of 1985. The section ''Better Value for Taxpayer's Dollar'' contains the following sentence: ''As a step towards eliminating duplication in the public sector, the Government will transfer OISE to the University of Toronto (Matas, 1985). This sentence could be ''the death knell for the controversial institute'' according to ''some academics''. And Nixon did not consult the OISE before expressing his viewpoint.

The institutes have, as it appears, a representative nature'' (Plaskow, 1985), which is expressed in the composition of their Board. - The School Councils for example even knew a joint-secretary structure with executive control in the hands of a triumvirate: one appointed from schools, one from the LEA's and one from the DES'' (Lacey, 1984; 159). That in itself is a political choice and because of it those institutes are political. As a consequence, they - like education policy itself - function in a context of power and interests. This applies also to the evaluation of those institutes. Hofstee (1985) rightly points out that policy programmes and programme evaluation form the ball that is kicked between the parties. The same applies mutatis mutandis for development programmes and their evaluation. The ''career'' of the institutes can best be understood as part of the conflict between the major forces (parties) in the educational system. Lacey speaks in the case of the Schools Council of ''the three-corned conflict between ... the DES, the local authorities and the teachers' unions in an arena overlooked and ultimately controlled by the

major political parties'' (1984; 159).

The problem to be underlined here is that the choice of an evaluation object and the inherent evaluation questions, the interpretation of both the evaluation criteria and the research findings and the attachment of consequences to the research findings, will not be an easy problem which can be solved on purely scientific grounds. Rather we are dealing here with conflicts of interests and the solutions will largely depend on the power position of the various parties. It may be expected, that in a time of economic crisis, the authorities will be interested in mainly the efficiency of the institute.

This as such already indicates the type of evaluation; that is to say the type of questions, which according to the authorities will have to be answered by means of an evaluation research - efficiency research. The decision taken by Nixon in the case of the OISE illustrates this. But I can also point out the discussions in connection with the evaluation of the Schools Council and the final decision taken by the British Government*.

In the case of the SLO it may be expected that the management organizations for evaluation of the SLO will be more interested in the question whether and to what extent the SLO actively respects the educational and ideological pluriformity of the Dutch Educational System. This is a major principle for the activities of the SLO and touches the institute in its existence (compare Jozefzoon and Marshall, 1983). It is however to be expected that the members of the SLO will be more interested to the extent and way in which the project materials are used. Intensive and correct use of the SLO materials may have direct consequences for security of existence of the members, which is a primary condition for the members as employees. The representatives of the educational organizations will be more interested in the usibility of the SLO materials, etc.

It is obvious that the contradictory interests will also have consequences for the interpretation of the evaluation-criteria. ''The use criterion'' will be applied differently by the various parties. The answer to the question: how many schools or teachers should use the product and to what extent before one can say that it ''is used well'', will not be answered equally by all parties.

In short: the political character of a national institute for curriculum development is a complicating factor in assessing the impact of its products and activities.

4.4 Conclusion

What do we learn from the foregoing? Firstly, the OISE research, the evaluation of the Schools Council and the impact-studies of SLO products show that the question of the impact of a national institute for

* Compare Plaskow, 1985.

curriculum development on the educational field is "not so straightforward as may at first appear". That does not mean to say that the question cannot be answered. "The nature of the answer" will depend to a great extent on "the criterion of judgement which is used to select one body of data rather than another" (Salter a.o., 1980; 15). Salter a.o. continue: "fortunately or unfortunately, statistics can in any case supply only part of the answer, since it is perfectly possible that the Council (read: national institute, EOIJ) exercises a more subtle and less easily detectable influence, on the general context within which educational opinion and educational choices are made. Secondly, for a complete picture of the impact of a national institute for curriculum development it is a necessity to incorporate in the study (1) the relationship of the institute "with bodies concerned with educational broadcasting, with educational publishers, LEA advisers, teachers centre leaders and colleges of education". (Salter a.o., 1980; 15), (2) an analysis of "the interests and expectations of the powerful groups and individuals who are in effect, the definers of success and failure"" (Lacey, 1984; 157; Hofstee, 1985; 285) and (3) to develop other research instruments than the traditional ones, which will take a long time ...!

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Part Two : Additional Information

7. Organization and structure of the Dutch education system*

* Part of the paper "Education in The Netherlands. Information composed for the third World Conference on Trends in Science Education", Enschede, 1984, by J. van Trommel.

1 Education and Government

The constitution of the Kingdom of the Netherlands says that ... "education is a matter of continuing concern to the government".

The schoolsystem is based on a number of Acts of Parliament:
The 1920 Primary Education Act;
The 1967 Special Education Decree;
The 1963 Secondary Education Act;
The 1960 University Education Act;
The 1966 Apprenticeship Act;
The 1970 Educational Experiments Act;
The 1983 New Primary Education Act.

2 State and private education

State and private education are financed on the same basis in the Netherlands. State education is that provided by central or local government [the State or municipalities]. Private education comprises all forms of education which come about as a result of private initiative, whether they are run according to religious principles or not.

State **nursery** and **primary** schools are provided by the municipalities, [there are no centrally administered state schools in this sector]. Each municipality is obliged to ensure that there are sufficient state schools, which are open to all children, irrespective of their religious pursuasions. The founding of private schools in this sector is dependent on private initiative: the schools must emanate from an institution or association which has legal personality. They only qualify for funding if they can demonstrate that the number of children attending the school will meet the legally prescribed minimum: if it does, then the municipality is obliged to help in the foundation and running of the school by providing the necessary funds. The amounts involved are repaid to the municipality by the state, on the same basis as for the state schools. Almost 70% of all the primary schools in the Netherlands are private. In secondary education even more schools are private, only 3% of all the schools for general secondary are state schools and the same in the case in vocational education.

But as a rule there is no difference in the education on private or state schools, other than schools based on a certain pedagogy or philosophy as Jenaplan schools [informal open education to be compared with the English Infant school] and Free schools [Rudolf Steiner/Anthroposophy]. Of course there is religious instruction on schools based on a denomination.

3 New primary education [basisonderwijs]

In August 1985 the new primary school [basisschool] is started, in which the nursery and primary school are incorporated. Education is from that date compulsory at the age of 5. The new Primary Education Act says that:

- education will be organized in such a way that pupils can go through an uninterrupted development process;
- education is to aim on the emotional and intellectual development and also on the development of creativity, gaining the necessarily knowledge of social, cultural and physical skills;
- education starts among other things from the principle that the pupils grow up in a multi-cultural society.

4 Compulsory education

As said education becomes compulsory at the age of 5 [from August '85] and lasts till the age of 16, followed by two years part-time education as no longer a full-time education is attended.

5 Secondary education [voortgezet onderwijs]

This comprises all post-primary education except the universities. The major categories of secondary education are:

- pre-university [v.w.o.]; consisting of atheneum and gymnasium [grammar school];
- general secondary [a.v.o.] consisting of a junior [mavo] and a senior [havo] level;
- vocational education [b.o.].

General remarks. To what type or category of secondary education a pupil goes, depends mainly on his intellectual skills. The choice [as a rule] is based on assessment of the knowledge and intelligence displayed by the pupil during his last year, or years, at primary school. As a rule during the last year children take tests provided by the National Institute for Educational Measurement [CITO]. Beside this assessment there is a report written by the principal of the primary school.

The first year in all secondary education is called the transitional class. This originally was meant to evaluate the choice that was made in order to make a switch possible or easier, although there is no comprehensive schoolsystem. But since the new system of secondary education [1968] there is a growing tendency towards combination of schooltypes. Such a schoolcombination [scholengemeenschap] mostly either consists of two or more types of general secondary or of a combination of types of

vocational training. During the past decade there also came "broad" schoolcombinations consisting of types of general and vocational education, more or less comprehensive.

The government prepares on legislation towards a comprehensive schoolsystem at junior level. Part of the philosophy behind schoolcombination and comprehension is to make transition easier and postponing the choice of schoolsubjects and career.

There is an extended system of evening classes which run parallel to many types of secondary schools and which can lead to the same qualification.

Pre-university education [v.w.o.]. This type of education is provided at two types of school: 'gymnasium' and 'atheneum'. Both types have a six-year course, with direct entry from primary school, and prepare pupils for university entrance. The distinction between 'gymnasium' and 'atheneum' is that the former **must** provide Latin and Greek courses, while it is not possible to take these subjects at an 'atheneum', except where an 'atheneum' has been granted special permission to teach Latin. After the fourth or fifth years, the gymnasiums and atheneums are divided into A and B sides. The B sides have mathematics and science as the main subjects in both cases; the A side at a gymnasium has classical languages as the main subjects. Each course culminates in a leaving examination in seven subjects, five compulsory and two elective. The five compulsory subjects are as follows:

gymnasium A: Dutch, Greek, Latin, one modern language [i.e. French, German or English] and history or geography or economics;
gymnasium B: Dutch, Greek or Latin, one modern language, mathematics, and physics or chemistry of biology;
atheneum A: Dutch, two modern languages, history or geography, and economics;
atheneum B: Dutch, one modern language, mathematics, and any two of the three sciences.

General Secondary Education [a.v.o.]. This type of education is given at junior and senior levels, all with direct entry from primary school. Junior general secondary education [m.a.v.o.] is a four-year course. The leaving certificate from a m.a.v.o. school may give access to senior secondary vocational schools [m.b.o.] and the fourth year of senior general secondary schools [h.a.v.o.]. H.a.v.o.-courses last five years, and the h.a.v.o.-certificate offers access to higher vocational education.
Like the pre-university schools, junior and senior general schools provide the broad basis for future vocational training, but at an academic lower level.

6 Secondary vocational education [beroepsonderwijs]

Vocational education in the Netherlands is divided into eight major types and is given at lower, intermediate and higher levels:
- Technical education preparing for technical careers, and nautical education preparing for careers in inland shipping, Rhine shipping, coasting, sea shipping and fisheries;
- Domestic science/home economics, which gives a general and practical preparation for housekeeping, the caring professionals and service careers;
- Agricultural education prepares for careers in farming and includes various forms of crop cultivation, agricultural trades and agricultural technology. Agricultural education is financed by the Ministry of Agricultural and Fisheries;
- Tradespeople's education prepares for self-employment in an trade, craft or service industry;
- Economic and administrative education prepares for bookkeeping and clerical occupations;
- Teacher training offers courses in primary and secondary teaching;
- 'Socio-pedagogic' education at intermediate and higher levels prepares for careers in youth work, adult education, cultural and social work, community development, personnel work, childcare and protection, health care, librarianship, journalism and other related professions;
- Arts education, only offered at higher level, prepares for careers in all branches of the arts: music, dance, drama, cabaret, the visual arts and film.

Lower secondary vocational education [l.b.o.]. L.b.o. plays an important part in the Dutch education system, as some 30% of children enter it directly from primary school. All junior secondary vocational courses last four years, the first two devoted almost entirely to general subjects and the last two to vocational training and education. There are five types:
1. Technical school [l.b.o.], including a school for nautical education;
2. Home economics courses [l.h.n.o.] are attended mainly by girls;
3. Agricultural courses [l.l.o.] include agriculture, horticulture and forestry courses and agricultural technology;
4. Tradespeople's courses [l.m.o.] sometimes called education for the retail trade;
5. Commercial courses [l.e.a.o.] are more general than the junior tradespeople's

Most types of lower vocational have an individualized stream for students who need special attention owing to learning or social difficulties [i.b.o.].

Intermediate secondary vocational education [m.b.o.]. In intermediate secondary vocational education the same types of schools exist as at

lower level, but there are many courses which don't exist on the lower level, e.g. social work courses, paramedical courses, laboratory courses.

Short secondary vocational courses [k.m.b.o.]. Short secondary vocational courses represent a new form of education for 16 to 18 years-olds, which facilities cooperation between junior and senior secondary vocational schools, young workers' educational institutes and apprenticeship training establishments. It provides facilities for vocational training, linkage and orientation programmes. The maximum length of the courses is three years. K.m.b.o. leads either to a job or to further education, which may take the form of advanced apprenticeships or related courses in senior secondary education. K.m.b.o. courses are also intended as a preparation for participation in adult society.

Apprenticeships. Apprenticeships are governed by the 1966 Apprenticeship Act and are characterised by an agreement whereby the apprentice receives training in a particular trade from an employer and at the same time receives general and theoretical vocational education at an appropriate institute. Entry to apprenticeships is usually from a l.b.o. course, but there are also openings for people who have attended other types of secondary school. There are two levels of apprenticeship training: elementary and advanced, the first taking at least two years and the second at least one year.

7 Higher education [h.o.]

Higher education comprises both university education, including university of technology, and higher vocational education. At present the two types of higher education are still governed by separate legislation, but government policy now aims to devise a unified system of higher education.
The major difference between universities and higher vocational institutes is that the one emphasis the academic approach to a subject and the other its practical side. There are at present 20 universities in the Netherlands and 330 higher vocational institutes of eight different kinds, providing day, evening and part-time courses.

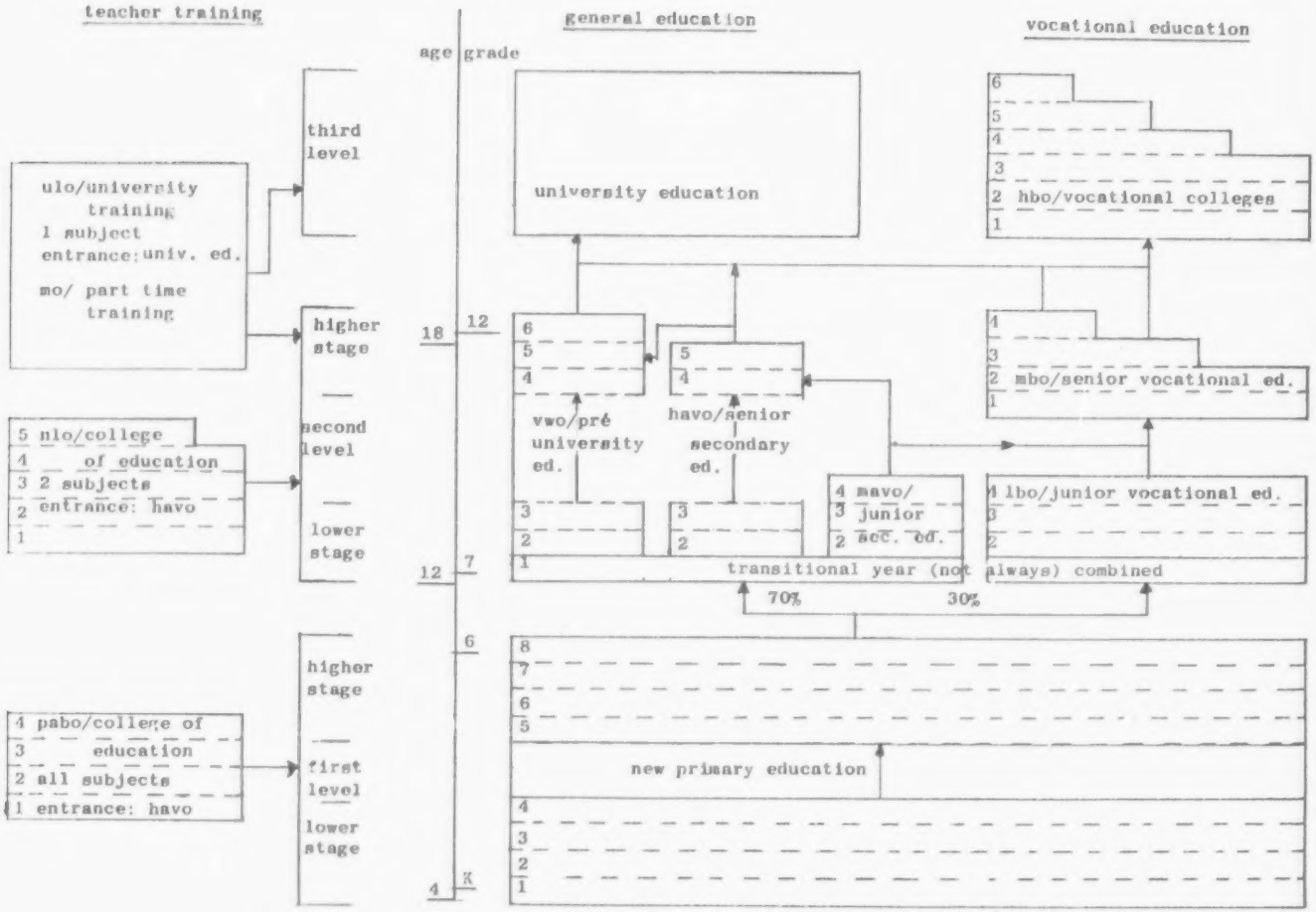
8 Teacher training

Training college for primary education [P.a.b.o.]. A four year course at the [new] training college for the [new] primary education gives qualification to teach all subjects at primary level. Specialised teachers other than physical education are a rarety in primary schools.

Colleges of education for secondary education are professional training courses - which means that students are prepared specifically for a career in teaching. Equal importance is placed on education and on the student's own subject. The courses provide a double qualification as each student takes a main subject to second or third-grade standard and a subsidiary subject to third-grade standard. Students who have taken both subjects at third-grade level are awarded third-grade teaching qualifications in both subjects, but those who have taken the main subject at second-grade level get a second-grade qualification, also in both subjects. The courses take four years for the subsidiary subject and four and a half years for the main subject. The entrance requirement is a v.w.o. or h.a.v.o. certificate.

A **first degree** teaching certificate is obtained as part of the **university training** and students then have to take a special course during three to six month at a [subject orientated] pedagogical department of a [sub-]faculty.

SCHEME OF FULL TIME EDUCATION IN THE NETHERLANDS



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9 List of abbreviations

a.v.o.	general secondary education
ba.o.	new primary education [combined nursery and primary]
b.o.	vocational education
bu.o.	special education
h.a.v.o.	senior general education
h.b.o.	higher vocational education
h.e.a.o.	higher commercial education
h.h.n.o.	higher home economics education
h.l.o.	higher laboratory education/higher agricultural education
h.m.o.	higher tradespeople's education
h.n.w.o.	higher physical science education
h.o.	higher education
h.s.p.o.	higher social work education
h.t.o.	higher technical education
i.h.n.o.	individualised domestic science education
i.l.o.	individualised agricultural education
i.t.o.	individualised technical education
k.m.b.o.	short secondary vocational education
l.a.v.o.	elementary general secondary education
l.b.o.	lower secondary vocational education
l.e.a.o.	lower secondary commercial education
l.h.n.o.	lower secondary home economics education
l.l.o.	lower secondary agricultural education
l.m.o.	lower secondary tradespeople's education
l.o.	primary education
l.o.-akte	lower school teaching certificate
l.t.o.	lower secondary technical education
m.a.v.o.	lower general secondary education
m.b.o.	intermediate secondary vocational education
m.e.a.o.	intermediate secondary commercial education
m.h.n.o.	intermediate secondary home economics education
m.l.o.	intermediate secondary laboratory education/senior secondary agricultural education
m.m.o.	intermediate secondary tradespeople's education
m.o.-akte	intermediate secondary school teaching certificate
m.s.p.o.	intermediate secondary social work education
m.t.o.	intermediate secondary technical education
N-akte	home economics teaching certificate
n.l.o.	new-style secondary teacher training
p.a.b.o.	training college for primary education
v.o.	secondary education
v.j.v.	young adults' education

v.w.j.	education for young workers
v.w.o.	pre-university education
w.o.	university education

8. The Dutch national institute for curriculum development [SLO]*

* From: SLO, National Institute for Curriculum Development, Information, Enschede, 1984.

1 The SLO: part of the Dutch educational support system

The National Institute for Curriculum Development [SLO] is an integral part of the Dutch educational support system. The position and function of the SLO can only be clarified by examining them against the background of the educational support system as a whole. A short description of this typical Dutch phenomenon is therefore first called for.

1.1 Educational support systems - Origins

In the course of the past century school attendance figures have greatly increased. Education, until then the privilege of a few, became a commodity available to almost every member of society. When the Education Act of 1900 made school attendance compulsory for all children between the ages of six and twelve years, a demand arose for professional help aimed at those children who had difficulty in learning.

One of the first tasks for the professionals was to measure the mental capacity of these children. There was a strong belief at that time, as there is still in some quarters, that failure at school was the result of mental deficiency. In the twenties, the broader concept of mental health was used to explain a lack of learning capacity. Children were referred to child guidance clinics where paediatricians, psychologists and social workers worked together as a team. The individual child, however, still remained the centre of attention. The views thus formed led to the introduction of multiple categories of schools to provide for the exceptional child. Children with learning difficulties left the ordinary schools, and the educational process in the great majority of schools remained unchanged. Education remained traditional. The introduction of new concepts in education by, for example, Montessori, did not make much head-way. Schools based on such concepts constituted an elite phenomenon within the mass educational system.

Only the Second World War and its aftermath succeeded in bringing about a more or less universal acceptance of the fact that change was inevitable. A taste of freedom and a longing for democracy, together with technological changes and the process of secularisation led, among other things, to a reappraisal of education as an important aspect of society. The accumulation of research in the social sciences helped to transform vague ideas into serious theories on new ways and means for education. There was an optimistic feeling that research in teaching would lead to better methods and, therefore, a better achievement level by pupils. The paradigm of research - development - diffusion [RDD] became an accepted model for educational innovation. The apex of this development was reached during the sixties and was reflected in widespread student disaffection to established educational systems. If school drop-outs were due to the structure of the educational system, then the system had to be

changed. The structure, functions and content of education had to change, from the infant school right up to university level, in order to enable these institutions to provide a place for everyone, each according to their own individual abilities.

These historical trends led to the foundation of educational support institutes in The Netherlands at different periods of time. First came institutionalized care for children at risk. This educational support had a strong diagnostic nature and originally consisted mostly of isolated activities, although they gradually became integrated. Educational support at that time took on a more preventive character due to the development of systematic research methods spanning the total child population.

Besides helping individual children, educational support was now directed towards the optimalisation of each child's school career. In the meantime, interest for the school itself, as an educational unit, was growing. As a result the development and innovation of education became another important topic. This led to the foundation of institutes involved with more sharply-defined responsibilities such as research into teaching and curriculum development.

There are at present in The Netherlands:
- local [or regional] Educational Guidance Centres [called SBD's after their Dutch initials];
- National Innovation Centres [LPC];
- a National Institute for Curriculum Development [SLO];
- a National Institute for Educational Measurement [CITO];
- a Foundation for Research on Education [SVO];
- a more or less separate support system for the 16-18 year age group with special emphasis on youth employment.

1.2 Local Educational Guidance Centres [SBD's]

Local educational guidance centres have educational psychologists and educational change agents on their staff, as well as other experts in the field of learning [dis]abilities and educational innovation. Their services are primarily directed at the infant and primary school level and their work includes the guidance of both children and their teachers. The educational guidance centres must restrict themselves to those particular learning and behavioural problems which are closely related to the learning process: problems which can be solved within the boundaries of first-line aid.

There are more than sixty of these regional educational centres receiving grants direcly from local and central government sources. In order to qualify for such a grant, a centre should be responsible for some 20.000 pupils, spread over the infant and primary schools within its area.

Together, these schools form the territory within which the centre

operates. This territory may comprise several towns and, in some cases, may even cover a whole Dutch province or county. There should be no overlap between the various territories. Most local educational guidance centres were founded during the nineteen sixties and seventies. Some of them even date back to the nineteen fifties. In quite a few cases, the centres were formed as a result of mergers between bureaus of educational psychologists and centres for innovation and education.
The centres are governed, in the main, by those boards which deal with local, public and private education.

1.3 National Innovation Centres [LPC]

In contrast to the local educational centres, the national ones have a somewhat longer history. They came into being, in an embryonic form, at the end of the Second World War, when the national teachers unions, together with the national boards for private education, instigated the formation of committees on innovation in education for various categories. During the early nineteen sixties, these committees and bureaus merged to become what are now known as the National Innovation Centres.
These centres, three in number, are financed almost entirely by central government funds. Each centre is responsible for its own particular denomination within the Dutch educational system. In no particular order of importance, they can be listed as follows:
- one serving the Roman Catholic sector of the educational system;
- one for the Protestant sector, with the exception of some Protestant "splinter groups" [who prefer to work independently] and
- one for the non-denominational sector.

Each of these centres has a managing board made up of representatives from various educational bodies. The National Innovation Centres serve both primary and secondary levels of education. When originally set up, they gave direct support to schools. In the course of time, they have sought to solve the problems which arise when a national body has to deal with a large number of individual schools spread across the country. Over the last ten years or so, they have withdrawn their direct support from primary education and this sector has been taken over by the local educational guidance centres. As far as secondary education is concerned however, schools still receive direct support. Apart from the above-mentioned activities the National Innovation Centres are also involved in various projects covering aspects of educational innovation. For each of these projects, they work in close co-operation with a small selection of schools. The results achieved by means of those projects will be used to assist local educational centres with the development of their know-how. Moreover, the National Innovation Centres deal with innovation development, or implementation projects, on an national scale. Within these national projects they fulfil co-ordination and support functions.

1.4 National Institute for Educational Measurement [CITO]

This institute was founded in 1968, by which time the concept of multiple-choice tests had fired many an imagination. This type of test rapidly gained ground and within a very short space of time was considered the best possible solution to the problem of assessment. Nowadays, the pendulum is swinging back, and the institute concentrates a percentage of its efforts on the development of open-ended tests. The National Institute for Educational Measurement has a managing board consisting of representatives from various educational bodies and the different denominations, together with representatives from the Ministry of Education and Sciences.

1.5 Foundation for Research on Education [SVO]

This foundation was created in 1965 and provides grants to various educational research centres, either independent or affiliated to universities. The grants are earmarked for applied research, as fundamental research is the responsibility of the universities themselves. The managing board of the foundation is composed in the same way as that of the CITO. The foundation is fully subsidized by the Ministry of Education and Sciences.

2 The SLO: its roots and responsibilities

2.1 Its roots

The most junior institute in the Dutch educational support system is the National Institute for Curriculum Development [Stichting voor de Leerplanontwikkeling; SLO], an organisation established in 1975.

The roots of the SLO however can be traced back to the nineteen sixties, when developments in the various subjects traditionally taught at school on the one hand, and in fields such as psychology and educational science on the other, necessitated a complete re-thinking of existing curricula. Increasing attention was focused on the relationship between the different school types and the co-ordination of teaching programmes at various educational levels [longitudinal curriculum planning]. The emphasis placed on the curriculum shifted; from being a mere description of the subject matter, it became an indication of the correlation between the curriculum and the larger framework: the curriculum, in relation to general and specific objectives, choice of subject matter, didactic procedures and all aspects of school organization.

It is certainly not surprising that the development of such complex curricula often proved to be an impossible task within the existing school

system. In the first place, there was a lack of expertise as to how it should be approached and, secondly, in most cases time and necessary funds were not available. In practice the result of this was that in the sixties numerous organizations, committees and work groups initiated varying activities in the field of curriculum development. An explicit over-all plan for these activities did not exist. There was no organization to co-ordinate and integrate them into a whole. Conse- quently, many parallel but unconnected projects were being developed. The Ministry of Education and Sciences added to the confusion by setting up several Curriculum Modernization Committees during the course of the nineteen seventies [known as CML's, after their Dutch initials].

This situation caused great confusion to school teachers. At a time when they really needed help and guidance, they did not know who to turn to in order to get it. As a result, all the educational organizations started to pressure the Minister in question in order to rectify what had become an unworkable situation. Finally, the appropriate steps were taken.

After extensive discussions, involving all kinds of educational organizations and following several lengthy parliamentary debates, the National Institute for Curriculum Development [SLO] came into being in January 1975.

2.2 The responsibilities of the SLO

The SLO was charged with the following main tasks:
- to devise model curricula and teaching kits for all educational organizations and institutions up to university level in The Netherlands;
- to endow projects for curriculum research and development to be carried out by, for instance, university institutes, and aimed at specific subject matters;
- to give advice, and to co-ordinate in the field of curriculum development.

"**To help schools, by providing them with examples of curricula**" - this could well be the device illustrating the primary aims and responsibilities of the SLO: the development of model curricula.

3 Organizational structure

The organizational structure of the SLO can be split into three main sections:
- the managing board;
- the executive committee; and
- the executive office.

3.1 Managing Board

The managing board is the highest policy-making body within the SLO. When forming the managing board, due consideration was given to the structure and diversity inherent to the Dutch educational system. The board, which meets monthly, is composed of thirty members, twenty-seven of whom are nominated by the various educational bodies and the different denominations. Of the other three, two are appointed by the Minister himself, whilst the last member, also an appointee of the Minister, acts as the independent chairman. The board's function is to decide upon both long and short-term objectives of the institute. It is not directly involved in development or administrative questions, although it does formally bear responsibility for management and the various projects. Despite the fact that all the costs of the SLO are borne by the Ministry in question, the managing board operates primarily as an independent body as far as educational policy is concerned. However, in this respect, a discrepancy tends to creep in between the principle and its practical execution.

3.2 Executive Committee

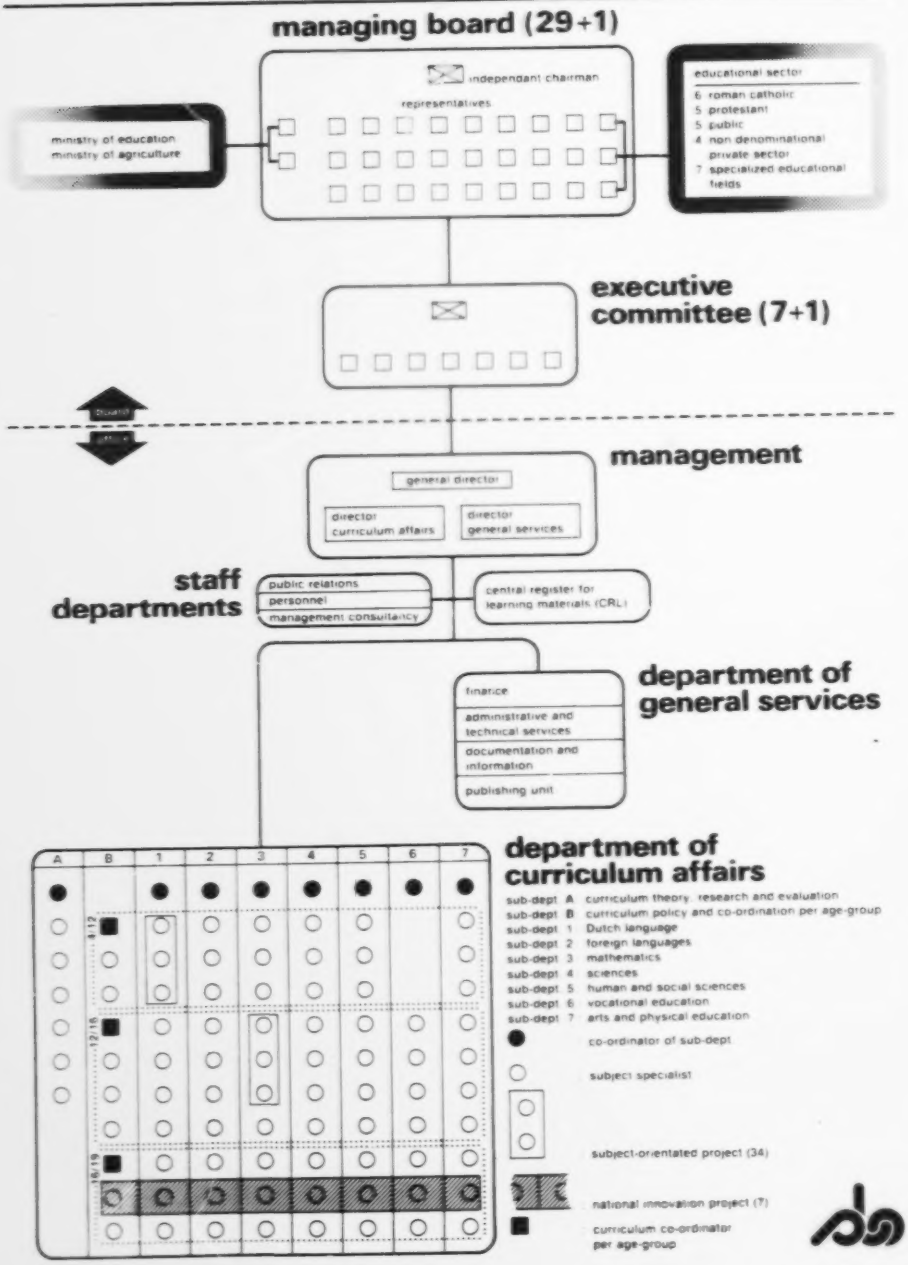
The executive committee comprises eight of the members of the managing board, including the chairman. They prepare the agenda for the board as a whole, implement the resolutions passed by it and consult the directors of the executive office.

3.3 Executive office

The actual curriculum development work itself takes place in Enschede, in the SLO-office. If you examine a map of the Netherlands you will find Enschede in the east, near the German border, about half way between north and south. Considering that in January 1977 the SLO had a staff of fifteen, one can safely say that it has grown into a large organization; at the end of 1985, it employed some two hundred and sixty people. The institute is organized along the lines shown in the following diagram.

The vertical axes show the seven **subject orientated sub-departments**, each of which deals with curriculum development in a particular educational field, irrespective of schooltype.
There are specialized sub-departments dealing with the Dutch language, foreign languages, mathematics, sciences, social sciences, vocational education, and arts and physical education.
Within these subject-orientated sub-departments are the **subject orientated projects**. There are subject-orientated projects for most types of school at the moment.

SLO organization plan



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The horizontal axes show a division into three age-groups: 4-12 years, 12-16 years and 16-19 years. These age-groups correspond in the [projected] divisions within the Dutch schoolsystem.

As far as the horizontal departments of the SLO are concerned, their efforts are primarily focused on the synchronization of those projects of the vertical sub-departments which concentrate on certain age-groups. The national innovation projects also cross the diagram horizontally. The responsibility of these innovation projects lies in an indispensable revision of an entire schooltype. The SLO has several of these projects, amongst them those involved in different types of vocational education.

4 Priorities

Restricted possibilities for new activities

The various tasks undertaken by the SLO, over which quite a lot has already been said, take up almost all the available reserves. This applies not only to the financial funds, but also to man-power. For the year 1985, the SLO had a budget of fome 23 million Dutch Guilders at its disposal. This amount will be fully absorbed by the programmes already in operation. In view of the large number of incoming requests, the SLO must apply its efforts in the most responsible manner possible.

The driving thought behind this is: that it is far better to produce excellent work in a restricted area, than to spread one's activities over such a wide area that their impact is dissipated.

Each incoming request is evaluated by the SLO according to 4 criteria:

1. Would the potential project meet the stipulations made by the SLO board in respect of its priorities?
2. Would this new project generate publications and know-how which could be of advantage to other schools [surplus value]?
3. Are the financial resources for a new project available?
4. Is the expertise for a new project available?

Priorities [1]

The SLO's territory covers all aspects of education, with the exception of the universities. With its staff of + 260 personnel, it obviously cannot possibly undertake to accommodate all curriculum requests arising in such a wide area. The SLO board, whose members represent educational interests, has therefore selected a number of fields which are to get the most attention: first phase secondary education [12-16 years], technical and vocational education, and, as subjects, the information sciences and general technical studies have been selected as priorities for the next few years.

Requests for projects within these categories have more chance of

being accepted than, for instance, applications for curriculum development in respect of either the upper classes of higher secondary schools, or higher vocational education.

Surplus Value [2]

A project request will also be assessed with regard to its "surplus value". In other words, what its contribution - in the sense of publications and know-how - could be as far as other schools are concerned. The objectives of the SLO do not include individual school support, after all.

Financial resources [3]

The [lack of] funds available for new projects is perhaps the greatest hurdle. Not surprisingly, the SLO is also affected by financial restrictions; the amount subsidized has been frozen for several years now, and is even diminishing somewhat.

All available resources - not only financial, but also in terms of manpower - are tied up in existing projects and there is only room to manoeuvre if one of these projects comes to an end - an infrequent occurrence, as the average project often has a life-span of several years, and many SLO projects have only recently started.

Expertise [4]

This criterium plays a double role in the assessment of project requests. Firstly, does the SLO have the know-how required for a particular project at hand, and secondly, if so, can it be spared for the period in question?

5 Some facts and figures

Name	: National Institute for Curriculum Development
Established	: 1975
In function since	: 1977
Subsidized by	: Ministery of Education and Sciences
Funds	: D.Fl. 23,000,000 per year (for 1984)
Fields covered	: From infant/primary education up to and including higher vocational education
Working area	: The Netherlands
Priorities	: First phase secondary education (12-16 years) Technical and vocational education Information sciences General technical studies

Type of activity	: Project development in co-operation with schools
Number of projects	: over 50 [see Chapter 10 "Summary of projects"]
Personnel	: ± 260, at least half of which is involved in curriculum development, the remainder being administrative and technical staff
Board of management	: Primarily representatives from educational institutions [27 out of 30]
Number of publications	: ± 350
Address	: Beltstraat 44 (per 1-1-1985) Enschede, The Netherlands
Postbox	: Postbus 2041 7500 CA Enschede, The Netherlands
Telephone	: [..31] 53-840840

9. An overview of current curriculum development projects by the SLO*

* This overview is primarly composed by Aad Lahuis, staffmember of the SLO sub-department for Curriculum Theory and Evaluation. I [the edit] wish to thank him for his collaboration.

1 Introduction

This chapter contains an overview of the current curriculum projects which are being carried out in the Dutch National Institute for Curriculum Development. The description of each project covers [a] the file number, [b] the title and, [c] the project goals. The projects are headed under the names of the sub-department under whose responsibilities they are carried out.

2 Sub-departments and projects

2.1 Sub-department 1: Dutch language

1 Project 3289 - Werken met boeken

Support documents for subsequent curricula for reading and literacy for students from 4 - 12 year [primary education] with special attention to children with reading difficulties and to the aspect of childrens's attitudes to reading.

2 Project 3429 - Taalvaardigheid in de basisschool

Support documents for curriculum development for Dutch language in primary education, on the level of the individual school and on a level which transcends individual schools [guidelines]. Prominent is a didactic approach that makes use as much as possible of topics which cover several subjects.

3 Project 3458 - Fries in het voortgezet onderwijs

Support documents for the development of curricula for the Frisian language in secondary education, on the level of individual schools and on a level which transcends individual schools [guidelines].

4 Project 3463 - Internationaal Correspondenten Netwerk Moedertaalonderwijs

To entertain an international network of correspondents for the exchange of didactic information pertaining to education in the first language. To promote comparative research on an international scale pertaining to education of the first language.

5 Project 3513 - Coördinatiepunt Nederlands in het voortgezet onderwijs

To collect and analyze experiences with topics such as education in language arts for students with special characteristics; the function of language in other subjects; Dutch as a second language; the Dutch language as a factor in a social determination process. This project may also be regarded as a preparation for a next project about Dutch language in secondary education.

6 Project 3601 - Leerplanontwikkeling Ethnische groepen, Intercultureel onderwijs en onderwijsstimulering [LEGIO]

The goal of this project is the improvement of chances of those students whose career in the Dutch educational system is being hampered because of ethnic characteristic and cultures. By reinforcement of their cultural identity and mutual acceptation within a context of a pluralistic community remedial educations is offered. In this project this is worked out in examples of curricula, in teaching-learning-packages and in proposals for regulation by the State.

7 Project 3604 - Handreiking Intercultureel onderwijs

In the context of intercultural education teachers are helped to make a more extensive use of existing teaching-learning-materials in line with principles for intercultural education in the primary school system.

2.2 Sub-department 2: Foreign language

8 Project 3472 - Taalvaardigheidsdoelstellingen vreemde talen onderwijs

Proposal for a general method to describe objectives for education in modern foreign languages [english, french, german, spanish], particularly pertaining to language skills.

9 Project 3519 - Oriëntatieperiode Moderne Vreemde Talen VO-1

In the project 3431 developmental work was restricted to selective actions in schools. For that purpose separate packages of subject matter were made.
The project 3519 aims at constructing a clear picture of:

a. the planning of English after EIBO [English in elementary education] in the first phase of secondary education, and
b. the planning of French and German in the first phase of secondary education.

Acceptable and validated models for school-working plans in foreign languages for the first year of secondary education not only require empirical support in school-experiments; they are also dependent on a conception of how the program is to be continued. With the foreign language part of the design for content-elements as a frame of reference ideas will be generated for the application of elements introduced there in programs in which also the place and function of grammar and vocabulary are capable of more precise definitions.

10 Project 3611 - Computerondersteund MVT-onderwijs

Collecting information about developments in the field of computer assisted education for modern foreign languages [english, french, german, spanish], with a view to possible SLO-activities in this field in the future.

11 Project 3555 - Engels in het Speciaal Onderwijs

Special provisions are necessary for the teaching of English in special education in the primary school system, for children who are not capable to follow the regular system. Proposals and examples will be offered in this project.

12 Project 3629 - Engels in de PABO

A curriculum for a course [60-80 hours] of Englisch for training centres for teachers in the primary school system.

2.3 Sub-department 3: Mathematics and Information Technology

13 Project 3381 - Wiskunde 12-16-jarigen

A new curriculum for mathematics in secondary education [students from 12-16].

14 Project 3433 - Wiskunde 4-12-jarigen

Improvement of essential parts in mathematical education for primary

schools [students from 4-12] by developing and implementing a new curriculum, on the base of the "realistic" theory of mathematics education.

15 Project 3482 - Ontwikkeling leerplan en vakdidactiek informatica

1] A curriculum for data processing in high schools with exemplary teaching-learning-packages and software;
2] A well developed didactic for teaching data processing, with a teachers' manual.

16 Project 3481 - Burgerinformatica

Support documents for the development of curricula in information sciences, for the lower level of secondary education. Also proposals will be prepared for regulation by the Ministry of Education and Sciences. Special care is paid to the coordination of information sciences with other school subjects.

17 Project 3511 - Computergebruik en informatica in het basisonderwijs

Preparatory activities for a project about the use of computers and the processing of data in primary education.

2.4 Sub-department 4: Sciences

18 Project 3213 - Natuuronderwijs voor de basisschool

1] Integrated science curricula for primary education, on the level of the individual school and on a level that transcends individual schools [guidelines].
2] Integrated science curricula for teacher training centres and refresher courses.

19 Projecten 3541 en 3620 - Milieu-educatie in de eerste fase van voortgezet onderwijs

In secondary schools students are educated with regard to environmental problems [pollution and protection of the environment]. In these projects examples of curricula are developed and specific thematic units are work ed out for this kind of education.

20 Project 3426 - Natuuronderwijs voor 12-16-jarigen

1] Support documents for integrated science education curriculum in secoundary schools.
2] Guidelines for integrated science education in secondary schools on a level that transcends individual schools.
3] Exemplary teaching-learning-packages on selected science thematic units.

2.5 Sub-department 5: Human and social sciences

21 Project 3250 - Sociale Wereldoriëntatie voor de basisschool

Support documents for education in the fields of social sciences, health, traffic safety, geography and history, religious and ideological studies. Special care is being paid to an optimal interconnection between these subjects.

22 Project 3377 - Leerplanontwikkeling maatschappijleer voor MAVO/LBO

Proposal for a core curriculum for social studies in secondary education. Support documents for developing school curricula in social studies in secondary education, with examples of teaching-learning-packages.

23 Project 3405 - Leerplanontwikkeling Geschiedenis en Aardrijkskunde

A method for developing secondary school curricula for geography and history.
A course for implementing this method.

24 Project 3411 - Leerplanontwikkeling godsdienstonderwijs

Innovation of religious education as subject in Protestant secondary schools.

25 Project 3424 - Leerplan Humanistisch Vormingsonderwijs

1] A theoretical foundation for a curriculum for humanistic education as subject in non-religious schools;

2] Research;
3] Support documents for curriculum development for humanistic education [see 1].

26 Project 3485 - Mens- en Maatschappij onderwijs 12-15/16-jarigen

Support documents for the development of secondary school curricula for social studies. Support documents will be made for use in individual schools, and by way of example selected thematic units will be worked out in teaching-learning-packages. Besides proposals guidelines will be developed at a level that transcends individual schools.

27 Project 3486 - Leerplanontwikkeling economie HAVO-VWO

Support documents for curriculum development for economic education for the upper level of secondary education.
1] proposals for a core curriculum economic education;
2] examples of school curricula with explanatory information;
3] examples of teaching kits.

28 Project 3456 - Educatief Project Ontwikkelingssamenwerking

The overall purpose is to promote that education in the necessity and problems of cooperation with developing countries will become a standard part of secondary education. To that effect proposals are prepared for state regulations. Support documents for curriculum development and examples of teaching-learning-packages.

29 Project 3516 - Modellen bijbelkatechese BaO-VO

Support documents for two curricula for biblical education in Roman Catholic elementary and secondary education. Principes of biblical education.

2.6 Sub-department 6: Vocational education

30 Project 3230 - BBO-monteur Elektro

A curriculum for electrical engineering for vocational education at a day release scheme with a special accent upon individualization.

31 Project 3317 - LTS - Elektrotechniek

A curriculum for electromechanical techniques and the implementation thereof in some experimental situations in lower vocational education.

32 Project 3373 - Algemene Technieken

The subject here is technical orientation for use in everyday life, which is taught in secondary education. Envisaged products are support documents for curriculum development in individual schools. Specific themes are worked out in exemplary teaching-learning-packages.

33 Project 3536 - Informatica Kantoorpraktijk LEAO/LHNO

For the lower level of vocational education in secondary schools a proposal is made for a curriculum office automation in the context of Office administration and Management.

34 Projecten 3446 en 3493 - Mechanische Techniek LTO, Bouwtechniek LTO

For the vocational branch of lower level secondary education support documents are made with examples of curricula for Mechanics and Construction Techniques.

35 Project 3478 - Alternatieve energie in het LBO

A support document for developing courses for the application of alternative sources of energy, with examples pertaining to a windmill project, a sunboiler project and, a biogas installation.

36 Project 3488 - Technische informatica BO

The introduction of Technical Information Science as a school subject area in lower vocational education.

2.7 Sub-department 7: Arts and physical education

37 Project 3209 - Bewegingsonderwijs 4-12 jarigen

Support documents for physical education in primary schools and, also support documents for curriculum development on school level, with exemplary teaching kits included.

38 Projecten 3369/3409 - Muziek in het [M]AVO/LBO

Principles and objectives for music education in lower secondary education, presented as a proposal for a core curriculum.

39 Project 3371 - Audiovisuele vorming in het basisonderwijs

Support documents for the development of a curriculum Audio-visual education in primary schools.

40 Project 3400 - Dans en Drama in de basisschool

A guideline for a school-specific curriculum for dance and drama education. Also the production of 160 examples of lessons on dance and drama education.

41 Project 3410 - Muziek in het [begeleid] basisonderwijs

Theoretical about the characteristics of music education and about ways people integrate music in their lives. Support documents for developing curricula for music education in primary schools.

42 Project 3491 - Tekenen in het onderwijs aan 12-15-jarigen

Fostering capacities for curriculum development of teachers by means of collecting data about teachers' experiences with the subject of drawing, a support document [guideline] for the teaching of drawing.

43 Project 3508 - Bewegingsonderwijs in het voortgezet onderwijs

Examples of curricula for physical education in the lower level of secondary schools, with special attention to detailed plans for special periods, to education and to the relationship with cultural conceptions about sport.

44 Project 3514 - Integratie van kunstzinnige vorming in project-onderwijs

An example of a curriculum in which esthetics and fine arts are seen to be taught together with other subjects in a project design.

2.8 Sub-department B: Primary Education and Teacher Training

The main task of this sub-department is the coordination of all SLO curriculum development activities for primary education and teacher training centre in relation to it. This sub-department however has also the responsibilities for the following projects.

45 Project 3105 - PABO Educatief ontwerpen

Curriculum development and educational designing as a subject in training institutes for primary school teachers.

46 Project 3512 - Zorgverbreding basisonderwijs

Efforts are being made in the Dutch primary school system to keep as many students as possible within the regular system. That requires that teachers are keen on diagnosing and remedying learning difficulties and that they have suitable materials for that purpose. In this project these special materials and other instruments are being developed, especially with regard to reading and arithmetic.

47 Project 3109 - Speciaal onderwijs

For students who have unsurmountable difficulties in following the regular school system, special educational provisions exist. For special education in the primary school system curricula and teaching-learning-materials are being developed in this project.

48 Project 3537 - Emancipatie en roldoorbreking in de initiële opleidingen

In this project attention is given to the characteristics of curricula in which the roles of men and women are not fixed in cultural prejudices. Proposals are made for programs in teachers training centres in which problems of role fixation and women's liberation are treated.

2.9 Sub-department B: Junior Secondary Education

The main task of this sub-department is the coordination of all SLO curriculum development [activities] directed towards any subjects or segments of junior secondary education. In addition to this, this sub-department has the responsibilities for the following curriculum development projects.

49 Project 3538 - Eindtermen

A two-phased activity in which a draft will be made of the so called final terms for VBaO [continued elementary education]. In the first phase in a number of subject oriented projects a number of examples of final terms will be created. Also the work to be done will be analysed which will eventually yield an integrated design for the final terms of VBaO. In the second phase the integrated design itself will be carried out.

50 Project - Samenhang Techniek-Verzorging Natuur

The working party to who this project has been assigned will aim at the following goals:
The establishment of meaningful relations between the subjects nature, technology and welfare, so that

1. two or three models of interdependence can be elaborated on [based among others on a number of descriptions of practice in which it is made clear how the relations between the subjects mentioned is shaped in schoolpractice];
2. a re-definition of the elements of educational content and recommendations concerning the proposed final terms can be formulated.

51 Project - Scholen in ontwikkeling [SiO]

The coordination of the project of SiO = schools in development processes lies in the hands of a national coordinating board. SLO is one of the participants.

The principal aims with which SLO participates in SiO, can be formulated as follows:
In the field of secondary education first phase [12-16 year old pupils] all kinds of curriculum publications have been produced by SLO or are being produced. In it all sorts of ideas, opinions and experiences in schools, have been worked out in various degrees of detail. Both concerned with separate subjects and with more general subjects that go across the en-

tire curriculum.
All these publications are there to directly or indirectly provide support to schools. Many schools appear to have a great need of support in the introduction of new ways, in the revision of programmes etc. Therefore it would seem useful that SLO contributes to the programmes of schools joining the SiO-project.

52 Project - Schoolwerkplan ontwikkeling [VBaO]

In addition to the cooperative relation with the VBaO-experiment school 'Het Baken' in Almere there will be established another cooperation with a school in which the VBaO formula is not yet brought into practice. The aim will be the development of an example of an integrated school working plan. In this project the starting points are defined by the publication Wat zouden ze krijgen in het voortgezet basisonderwijs? [What curriculum would be offered in the New Comprehensive Junior Secondary Education?]. Together with it the publication Samen ... [Planning together? Yes, of course.] will lay at the basis of the development.

It is the aim to bring forth a planning-document that as closely as possible is related with school-reality. In it will be shown how and under what conditions elements of content from 'Wat ...?' became accepted by teachers and pupils as teachable and learnable respectively. This will be shown among other things in what are called ''three-dimensional'' pedagogical and didactical forms.

2.10 Sub-department B: Senior Secondary Education/Intermediate Vocational Education

The main task of this sub-department is the coordination of all SLO curriculum development activities for the higher secondary education. This sub-department however has also the responsibilities for the following curriculum development projects.

53 Project 3628 - Een deel-beroepsopleidingsprofiel voor het gebruik van CNC-apparatuur

For a particular of engineering computerized machinery is being used. That requires a special course for which objectives are developed in this project: use of CNC-apparatus.

54 Projecten 3630, 3631, 3103 - Opleidingsleerplannen voor het MTO, MEAO/MMO en MDGO

These projects have to do with the vocational branch of secondary education [higher level]. Proposals are made for core curricula for several departments, technical, administrative, health care and social services. Special attention is paid to organizing the contents in so called modules, units which make possible a flexible organization and optimal integration. The projects will yield supportive documents for curriculum development and examplary teaching-learning-packages.

55 Project 3104 - KMBO

Support documents for curriculum development for a two years vocational course in secondary education. Also proposals for general regulations.

56 Project 3545 - MDGO - UV

A proposal for a core curriculum for vocational training in personal care services, such as hairdressing, hand and foot care, beauty care and so on. Support documents for vocational training in secondary education [intermediate level].

57 Project 3563 - BIS

A system for storing and managing information about occupations for curriculum development in vocational education.

58 Project 3564 - Choices

A computerized system for choosing schools and occupation, which can be applied in all school systems and beyond. This project is carried out in collaboration with sub-department VI.

59 Project 3593 - Beroeps- en Opleidingsprofiel Ergotherapie

An authorized set of objectives as a basis for curriculum development for the vocational education of occupational therapists.

60 Project 3610 - Participerend leren in het MBO

The focus in this project is the interconnection between educational activities inside the school and educational activities outside the school, in the context of vocational education. For several departments of vocational education proposals are made for the development of curricula in which this interplay between internal and external activities is the leading principle. Also proposals are made for general regulations by the Ministry of Education and Sciences. The project will yield worked out examples for use in schools.

61 Project 3108 - IWOS

This project concerns adult education in the socalled open-school system, in which all kinds of educational opportunities are open to every adult without official entry requirements. Support documents are made for curriculum development as well as exemplary teaching-learning-materials, particularly for courses in elementary education.

10. A review of Research Projects for SLO under Auspices of SVO - from 1978

1. Introduction

These particulars deal with projects contracted on behalf of SLO, that have been completed, are in progress, or will be performed before long, and they refer to the period from 1978 until now. In section 2, a review is presented of the projects that have been done already. In section 3, a review is presented of the projects that now are carried out and, in section 4, the projects that will be started in 1986 are described.

2. Completed Research Projects

2.1 Project OVI: Onderwijzen voor Individualiseren [3202]

This project started in 1976 and it was conducted by LICOR of the Leiden University; its objective was "to investigate if general educational requirements can be identified and used for teaching with individual groups in primary schools in the Netherlands. After an orientation phase of one year, two other phases were recognised. The aim of the second phase was "the development of a curriculum in order to satisfy the needs of teaching in separate groups for primary education". In particular, the project investigated: [a] research and development of the teachers training curriculum and [b] research and development of an organization structure and a plan for carrying out the work programme. In the third phase, the investigation was directed at "the questions which refer to the capacity to teach the general educational requirements with individual groups and the conditions required to do so". The project had been financed jointly by SLO and SVO, the annual costs had been 514,000.-Dutch guilders.

2.2. Project "Receptieve taalbeheersing" [3202]

This project started in 1978 as a continuation of the SVO-project 0-275 and it was performed by the Didactics Institute of Amsterdam's Free University, the Psychological Laboratory of the State University of Utrecht and the De Vooys Institute, also of the State University of Utrecht. The aim of the project was "the development and testing in schools of a prototype course, based upon the scientific experiments, for primary educations and directed at the promotion of a receptive language command by the pupils, especially, for understanding reading". The project was financed jointly by SVO and SLO and the annual costs were 280,000.-Dutch guilders.

2.3. Project 'Denken en doen' [in ATO] [3375]

This project started in November, 1981 and was conducted by RION. The main objective of the SLO-project General Techniques [AT] had been the promotion of problem solving in the field of teaching. This investigation was directed at the contents and form of this main objective. An interesting supposition of this SLO research enquiry arose from the fact that many people in the educational field, the education support structure andthe teaching profession saw it as an important part of AT[O]. The research lasted two years and cost 189,000.-- Dutch guilders annually, being financed jointly by SLO and SVO.

2.4. Project "Het gebruik en de bruikbaarheid van de structuur schoolwerkplan van de SLO"

The project group for Curriculum Development in Primary Education [LOB] published its first version of an Information Package for the School-specific Curriculum ["schoolwerkplan"] in May, 1979. A second version appeared in April, 1981 as a result of reactions to the first version by schools, and others. The information package comprised seven parts, namely, an introduction, general information, literature references, a procedural diagram, a structure for a school-specific curriculum, check-lists, a review and summary of subjects. This investigation's work included the second edition of the information package, especially the unit called: School-specific Curriculum Structure. The latter offered assistance to schools so that they could produce their own specific curriculum. The general question at the centre of this project concerned the preparation of information for the way that school teams could make use of this Structure for producing their own curriculum. The work of the project was done by RION in the years 1982-83 and the total costs were borne jointly by SVO and SLO.

2.5. Project "Differentiatie-maatregelen ten behoeve van Algemene Technieken' [3505/1082]

This project started in October, 1983, and ended in January, 1985. The work was performed by RION and the total costs were 115,000.-- Dutch guilders. The aim was to collect information in order to answer the question: "How can General Techniques [AT] be differentiated?". The research comprised two relatively independent investigations based upon the following two groups of questions:

A.1 What differentiation regulations are described in literature?

A.2 Which of those described differentiation regulations can be recommended for teaching General Techniques, or incorporating them

into the first version of a school-specific curriculum?

A.3 What will be the effects of these differentiation regulations on the pupils' results, pupil's motivation and teachers' behaviour?

B.1 What are the implicit ideas of teachers of General Techniques about differentiation regulations?

B.2 What differentiation regulations have been applied by the teachers, how were they used and why?

B.3 Which factors are important for deciding whether to introduce differentiation regulations into General Techniques or not [including teaching concept, material characteristics, 'know-how' for teachers, and organisation]?

2.6. Project Evaluatie leerplan Fries''

The project with this title was performed in 1983 by RION at the request of SLO and the finances were provided by SVO. The first phase of this project was ''the collection of information that will be suitable for making a detailed picture of a course for the Frisian language in a specific school''. The stress was on the first of two phases; the main concern was to describe the situation in schools with respect to the subject of Frisian language. In the second phase, the central question was ''which characteristics of the school-specific curriculum does the course for the Frisian language have to satisfy in order to be able to give a better form to teaching it?''

2.7. Project 'Beginsituatie Algemene Technieken'' [3468]

This project started in 1983 and was completed in 1984 by the Subfaculty of Educational Studies at Twente University of Technology. The total cost were 100,000.-- Dutch guilders. The central problem of this investigation concerned ''What is the starting position of 12 - 13 year old pupils regarding the first 63 objectives of the subject area ''General Techniques'' [AT] before they commence their various forms of secondary education?''

2.8. Project ''Language Skills in the Primary-school'' [3469]

This project is started in 1983 and was completed in 1985 by the ITS, a research institute of the Catholic University of Nijmegen. The aim of the project is to carry out an evaluation of the way that the development project functioned. It was financed jointly by SVO and SLO and cost 183,000.-- Dutch guilders.

2.9. Project "Onderzoek naar de impact van drie SLO-producten [3457]

Within the framework of an investigation of the impact of the SLO, SVO provided resources for financing an investigation into the usage and effects of three SLO curriculum documents. The research started in 1983 and ended in 1985 for a cost of 125,000.-- Dutch guilders. It was performed by the ITS.

2.10. Project "Economie-MAVO" [3450]

This evaluation project began in 1983 and was completed in 1985. The request came from SLO and the total finances were 100,000.-- Dutch guilders entirely from SVO, but the work was done by the RION institute. In this investigation, the accent was put on the comparison of two teaching packages for Economics, in terms of suitability and it had to satisfy three propositions, namely:

1. How far were the subject objectives proposed by SLO being achieved, via the Malmberg package in classes 2 and 3, and via the experimental SLO:Malmberg package in class 4? At the same time, the suitability of the Malmberg package in comparison with the Versluys package was questioned, after being tested in practice with pupils.
2. How closely did the lesson-giving behaviour of teachers, with each of these packages, comply with the achievement of the subject objectives?
3. How well were the subject objectives, as formulated in the curriculum [SLO, 1981] related to teaching practice with the SLO/Malmberg and Versluys packages being received?

These propositions were related to the effects on pupils, to teachers' lesson-giving behaviour, as well as, to the contents of new procedures for economics. In the meantime, SVO had signed another contract with RION for a subsequent investigation in which four different teaching packages would be compared with each other.

2.11. Project "Landelijke Evaluatie-onderzoek 100 scholenproject" [3481]

This project started in 1983 at the request of SLO and it was completely financed by SVO as an evaluation investigation. The executive agency was the Sub-faculty of Applied Educational Studies at Twente University of Technology. The aim of this project was to make an inventory of the state of affairs regarding Information technology in the first phase of secondary education: i.e. the junior secondary education. The results of this investigation could be important for the further development of this new teaching area in secondary schools. For an expansion of this project,

Twente University received an extra grant of 69,693.-- Dutch guilders for the period of 1 November, 1984, to 30 April, 1985.

3. Projects in Progress

3.1. Project "Interne differentiatie in heterogene brugklassen bij wiskunde [3453/0647]

This project began in 1982 and was due to end in January, 1986. It was being performed by VOU at the request of SLO. The aim was "making a contribution to the development and theoretical justification of the model for a school-specific curriculum ["schoolwerkplan"] and teaching packages for differentiated Mathematics education for a wide heterogenous range of 12 - 16 year old pupils in different forms of secondary education [LBO, MAVO, HAVO and VWO]. In this project, an attempt was made to find the particular characteristics needed for the curriculum in order to achieve this objective trough careful research. This research had to "make a contribution to the curriculum's improvement and the clarification of the teaching concept that forms the foundation of such a curriculum. The research had two objectives: practical improvement and theoretical stucturing". The annual cost of this project was 150,000.-- Dutch guilders which was provided jointly by SLO and SVO.

3.2. Project 'Natuuronderwijs 12-16-jarigen' [3426/3034172]

This project started in 1984 and should last two or three years. It was requested by SLO, financed jointly by SVO and SLO, and is being carried out by the SCO* institute. The costs in 1985 amounted to 182,000.-- Dutch guilders. The investigation in this project concerns:

1. The fields of interest of 12 - 16 year old pupils in Nature Studies that can be incorporated into their curriculum.
2. The differentiation of these interests of 12 - 16 year old pupils according to their sex, environment and background.
3. The experiences and conceptions of 12 year-olds regarding natural phenomena.
4. The "common" Dutch words used to describe things in Nature.

The investigation has two phases and the output of the first phase comprised the following items:

- a determination of the concrete challenging situations that satisfy particular requirements;

* i.e. Foundation Centre for Educational Research

- an itemised procedure for studying Nature which has been tested in a given number of schools;
- a plan for a supplementary investigation in order to answer specific questions.

3.3. Project 'Eindsituatie-onderzoek Algemene Technieken' [3587]

Starting in 1984, this project was completed in 1985 at a cost of 65,000.-- Dutch guilders provided jointly by SVO and SLO. It is being performed by Twente University of Technology in response to a request from SLO. The general question under consideration is "What is the final situation of 14 - 15 year old pupils who have undergone the one to two year course in General Techniques [AT], with reference to the objectives for teaching such a course as reported in the AT curriculum proposed by SLO?" In order to conform with the project's terms of reference, this investigation is connected to the Assessment Research project which compares the needs of pupils who have been taught AT and those who have not.

3.4. Project 'Functioneel aanvankelijk leesonderwijs' [3625]

This project which started in 1984, has a duration of two years and it is being performed by SCO. The request came from SLO and the finances from SVO and SLO; the costs total 170,000.-- Dutch guilders. It is expected that this investigation will be able to answer the following questions:
- What would be the form of the initial years of teaching for Reading and Technical-reading in traditional innovative schools?
- What are the learning characteristics of the various forms in the initial years?
- How can the initial Technical-reading be taught without a fixed course and what will be the effects?
- Which characteristics need to be developed for the initial teaching of Technical-reading at micro- and meso- levels without a fixed course?

This research programme has two phases, the first being a study of the available literature and the second an empirical investigation.

3.5. Project 'Scheikunde-MAVO' [3618]

This project was contracted in 1985 and the work will only start in 1986. SCO was appointed by the SVO to carry out this project which is financed jointly by SLO and SVO. This time, the questions to be answered are:
1. What is the impact of teaching and learning materials on schools which have not been involved with developing them?

2. What benefits do the pupils gain from using this material for secondary education [MAVO and HAVO], as compared to pupils who have already been taught with this material?

The investigation has to give a better insight into the manner of implementing material developed by SLO for schools.

3.6. Project 'Spaans in het voortgezet onderwijs' [3617]

This project began in 1985 and will end in 1986. The investigation was initated by SLO, is being done by ITS and is financed jointly by SLO and SVO. There are two phases, a preparatory and a central phase. The aim of the project is to answer questions about the effects of the new Reading didactic[s] regarding readability, vocabulary and knowledge of idioms; as well as their relationships with other languages and the usefulness of these didactics for the development of curricula for teaching other modern foreign languages. The output must comply with the terms of reference of this project which are twofold; firstly, a global review of the actual didactic used by teachers in accordance with the requirements of the new Reading didactics. Secondly, a research plan for investigating the effects of the new Reading didactics on pupils. It is expected that the results of the central phase will help to decide the choice, development and implementation of new Reading didactics, taking into account the overall evaluation of this investigation.

4. Projects in Preparation

4.1. Project Engels in het basisonderwijs [3636]

Proposals for the curriculum of English in primary schools were first made in 1979 and were based upon the communicative requirements of the language. Before that time, a teaching package was worked out, oriented towards linguistics and grammar. The research project will last two years for an annual cost of 90,000.– Dutch guilders and it will be directed at three questions:

1. What is the command of English acquired by pupils who have followed a course on the communicative requirements of that language?
2. What are the effect of the two procedures on: the command of language, attitudes, and motivation of pupils?
3. What are the effects of the two procedures as far as the teachers are concerned?

This research will be done by RION and, it will be financed jointly by SLO and SVO.

4.2. Project Maatschappijleer voor het LBO en MAVO [3646]

This project will involve a cooperation between SLO a number of schools. It relates to improvement of the existing, rather vague, topics for teaching Social-studies. Meanwhile, this project has produced some reports, but now, it is a case of empirical investigation to get information about the impact of the documents: "Indications for ...., ... "and "Examples of .....". In this research, answers will have to be found to the following questions:

1. Will the outputs of the project cover the teaching needs of the subject Social-studies satisfactorily, at the Lower secondary school level [in the opinion of teachers]?
2. Will the outputs of the project relate to the planning decisions that have to be made by teachers: in the area of objectives, subject matter to be taught, arrangements and didactic design of the course for Social-studies? How can they be recognized and achieved?
3. What will be the effects of the project's findings on the pupils themselves?

4.3. Project Gericht schrijven: de NLO's en de verspreiding van de resultaten van het project Gericht schrijven [3619]

During a reorganisation of the project in 1981, part of the development work was concentrated on four participating schools. The development of an examination - testing procedure was taken up by a development group of ten teachers from the different schools in the project. The findings of both, the development schools and the development group, are presently available giving the provisional examination procedures that will be analysed for relevance to the New Teachers Institutes [NLO's]. Two outputs [the background literature and the video tape] are intended, in the first instance, for this target group. It seems to be important for SLO to know if the reactions of the NLO's can apply in its own affairs. The questions being investigated are:

1. Do the results of the project "Gericht Schrijven" have a place in the curricula for NLO's?
2. If they do, how many of the findings will be implemented?
3. Have the NLO's any specific interest in using the findings of this project, in particular, the video tape?
4. Is any information discovered in this project missing from the SLO curriculum and how can the schools themselves overcome this problem, if it is?
5. Are there any differences in the ways that the findings of the project are taken up in the curricula by the NLO's, for teaching on one hand and for refresher courses on the other hand?

This investigation will be performed by VOU at Utrecht and it will be funded jointly by SLO and SVO.

11 important adresses:

The Department of Education and Sciences
P.O.-Box 25000
2700 LZ Zoetermeer
Telephone: 079-531911

National Support Institutes for Education.

SLO [National Institute for Curriculum Development]
P.O.-Box 2041
7500 CA Enschede
Telephone: 053-840840

CITO [National Institute for Educational Measurement]
P.O.-Box 1034
6801 MG Arnhem
Telephone: 085-455555

SVO [Foundation for Educational Research]
P.O.-Box 19050
2500 CB The Hague
Telephone: 070-824321

National Innovation Centres. [LPC's]

APS [non denominative]
P.O.-Box 7888
1008 AB Amsterdam
Telephone: 020-441815

CPS [Protestant]
P.O.-Box 30
3870 CA Hoevelaken
Telephone: 03495-4214

KPC [Roman Catholic]
P.O.-Box 482
5201 AL 's-Hertogenbosch
Telephone: 073-215435

Research Institutes.

ITS: Instituut voor Toegepaste Sociologie van de Katholieke Universiteit Nijmegen [Institute for Applied Sociology of the Catholic University Nijmegen
Graafseweg 274
6532 ZV Nijmegen
Telephone: 080-780111

RION: Instituut voor Onderwijsonderzoek van de Rijksuniversiteit Groningen [Institute for Educational Research of the State University of Groningen]
Westerhaven 15
P.O.-Box 1286
9701 BG Groningen
Telephone: 050-118070

SCO: Stichting Centrum voor Onderwijsonderzoek van de Universiteit van Amsterdam [Foundation Centre for Educational Research of the University of Amsterdam]
Singel 138
1015 AG Amsterdam
Telephone: 020-229471